DIV. OF FISHES

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COMMERCIAL FISHERIES REVIEW

A review of developments and news of the fishery industries prepared in the BUREAU OF COMMERCIAL FISHERIES.

Joseph Pileggi, Editor

Address correspondence and requests to the: Chief, Branch of Market News, Bureau of Commercial Fisheries, U. S. Department of the Interior, Washington 25, D. C.

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COMMERCIAL FISHERIES REVIEW

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AERIAL FISH SPOTTING IN THE UNITED STATES COMMERCIAL FISHERIES

By James L. Squire, Jr.*

SUMMARY

About 70 aircraft are used by the United States commercial fisheries to locate concentrations of schooling fish and to assist the fishing fleet in their capture. Use of spotter aircraft has enabled the fishing fleet to increase its efficiency by reducing the amount of search time required to locate concentrations of fish.

One of the primary reasons for successful aerial fish-spotting operations since the World War II period was the development of reliable light aircraft engines and electronic equipment.

Each commercial species requires a specialized spotting technique. In some fisheries operations may be conducted only during daylight hours, or at the hours of dusk, or at night only during periods when there is no moonlight. The skill of the spotter pilot is dependent upon good visual acuity and the ability to "recognize" schooling fish and to determine species from aerial observations.

Altitudes of operation may vary from 300 to over 2,000 feet.

Tuna, sardines, salmon, mackerel, anchovies, barracuda, menhaden, bonito, and Atlantic herring are some of the species that are fished using aerial spotting as an aid.

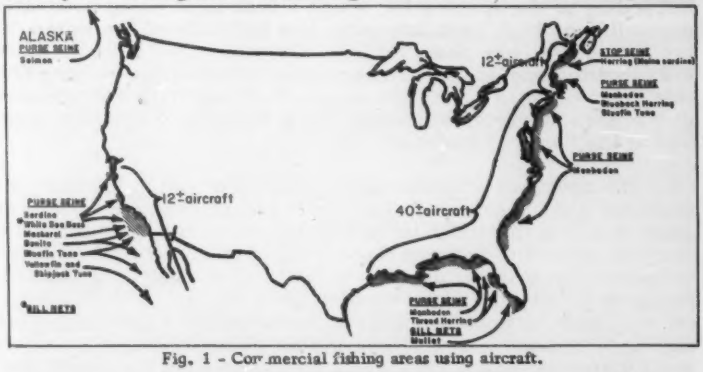

Fig. 1 - Commercial fishing areas using aircraft.

One of the hazards of aerial fish spotting is mid-air collisions. Seven fatalities have been attributed to mid-air collisions between fish spotter aircraft in the past five years. Cooperative regulations have been developed by fish-spotter pilots to reduce the chance of mid-air collisions.

The exact value of aerial fish spotting to the commercial fishing industry is not known but is considered to be substantial. Some fishing vessels are at times reluctant to journey to the fishing grounds unless an aerial reconnaissance of the grounds has been made.

Charges for the fish-spotting service varies from one area to another--both the rate and method of computing payment.

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The use of aircraft for fish spotting will increase in the future and light aircraft now used in some fisheries will undoubtedly be replaced by one-man helicopters, when the development of that aircraft has reached a point of dependability and its initial cost reduced.

BACKGROUND

The search for methods to develop the efficiency of commercial fishing has resulted in an increased use of light aircraft in many domestic and foreign fisheries during the past decade. Approximately 70 aircraft are now in use throughout the United States during the various fishing seasons for the purpose of scouting for concentrations of schooling fish and directing fishing operations of the commercial fleet.

The first use of aircraft for scouting concentrations of schooling fish was reported to be in 1920 for menhaden in the Atlantic. Several attempts to use aircraft and blimps for fish spotting were recorded for the period before and during World War II. Since World War II, by using aircraft to aid in spotting surface schooling fish, fishing vessels have been able to reduce the amount of search time. This is due to the aircraft's ability to search a tremendously greater area during a given period of time, to observe schooling fish when below the surface, and assist the fishing vessel in selecting the fish school with the approximate desired tonnage. In some instances aircraft have enabled vessels to fish during daylight hours where previously night fishing during the dark phase of the moon's cycle was the only conventional method, thereby increasing the productive efficiency of the fishing fleet.

One of the principle factors that has resulted in the widespread use of private commercial aircraft for fish spotting was the development of reliable light aircraft engines, and dependable radio equipment.

TECHNIQUES OF OPERATION

The various United States fisheries have independent methods of search and spotting techniques developed for the species that are of direct concern. Search altitudes may vary according to the species for which a search is being conducted. Under certain conditions, depending on high light intensity, low turbidity of the water, and surface schooling, concentrations of fish are observable at altitudes of several thousand feet. However, most commercial spotting operations are conducted at altitudes ranging from 500 to 1,500 feet. Species that are available during the hours of strong light and are abundant in large schools are usually observable from higher altitudes than those species generally occurring in small schools and at the hours of reduced light.

The accuracy of observations involved in fish location is a function of the pilot's ability, training, and experience. The skilled fish-spotter pilot has developed an ability to distinguish subtle differences to be found in the color composition of water masses containing near-surface schooling fish and those without fish. Proficient fish spotting is dependent on the visual acuity of the pilot, his ability to discern gradations of luminosity emitted from the surface and to then discriminate between color or light intensity. He then, "recognizes" or perceives some distinctive inherent characteristic associated with a fish-school target. The fish-spotter pilot has developed, through many hours of observing, a background of training and experience which provides the associations necessary for the determination or recognition of targets of schooling fish. When persons inexperienced in observing schooling fish are taken on a fish-spotting mission, they usually fail to observe concentrations of fish even though they may be quite obvious to the trained observer. However, most persons with good visual acuity are able to distinguish schooling fish with a short period of instruction.

The second phase of the recognition process, and one of great importance to the commercial fishery, is the determination of species. Determination of species may be on the basis of color, shape, behavior, or other differences and may be a combination of two or more factors. If operations are in areas where one species predominates, the problem of species recognition is reduced. However, in areas such as southern California where several species--sardines, anchovies, bonito, barracuda, and mackerel--are selectively sought by the commercial fleet, there is a need for further refinement of identification methods, as

schools of those species may appear to be indistinguishable from one another. The more skilled fish spotters have developed observation techniques to determine the differences between the commercial species.

AREAS OF OPERATION

Aircraft are now being used in the following areas for fish spotting: Alaska: salmon; Pacific West Coast: sardine, mackerel, bonito, sea bass, barracuda, anchovy, and tuna; Gulf of Mexico: menhaden, and thread herring; Atlantic Coast: menhaden, Atlantic herring (Maine sardine), blueback herring, swordfish, and bluefin tuna (see fig. 1).

Menhaden, tuna, sardines, salmon, sea bass, mackerel, swordfish, and anchovies are some species that are at times available and easily observed from the air, and are fished under conditions of bright sunlight (see figures 2a and 2b, and figure 3).

In contrast to such species is the Atlantic herring (Maine sardine); which is usually observable only under conditions of reduced light, during one to two hours from dusk till darkness. At this time the herring rise from the bottom and migrate toward the inshore areas. Commercial fish spotting for Atlantic herring is sometimes conducted at altitudes down to 300 feet to better identify small schools that may be confused with the rocky bottom and submerged kelp areas that are common to the coast of Maine. Aircraft are sometimes used to examine the stop-seined area for the results of the previous night's fishing, to determine if the quantity of fish caught is worth moving into a seine pocket for holding.

Figs. 2a and 2b - Anchovy schools near shore, north of San Quintin, Baja California, Mexico. Altitude 150 feet (2a), 700 feet (2b). Concentrations extended for 2½ miles in the immediate offshore area.

Aerial fish-spotting operations are conducted during the day, and at night off southern California during periods of the dark cycle of the moon. Sardines and other pelagic schooling species have been located at night by the luminescence of planktonic organisms, commonly called by fishermen as, "fire in the water." This is the result of the "plankton" being agitated by the schooling fish and is a phenomena that is observable only during the dark period of the moon's cycle. This luminescence is observable from the air and is used by the aerial spotter to locate schools, as it is by the surface fisherman.

Night aerial spotting operations have been a common practice in California for the past five years. Night-and-day operations ranging 125 miles or more into the offshore areas are conducted using single-engine light aircraft. Such planes used primarily for tuna spotting, either off southern California or off the southern end of Baja California, Mexico, are capable of flights of 12 hours or more. Flights of extended duration occur during the moon's cycle of full darkness and the fish spotter aircraft may remain in the air from dusk till dawn.

Fig. 3 - Concentrations of anchovies off Coronado Strand, Calif.

Operating procedures between the fishing vessel and the spotter aircraft may vary greatly. In some areas the aircraft is is used to guide the seine vessel to an area where schooling fish are found to be abundant; and the seine vessel will then proceed with the fishing procedure, using surface observations as a guide. In other cases, the aircraft spotter who is proficient in seining procedures will direct the setting of the purse seine, or stop seine, by radio contact with the captain of the fishing vessel. When the schooling fish are not close to the surface and therefore not visable from the fishing vessel it is still possible for the aircraft spotter to locate the school and direct the positioning and setting of the seine.

Fig. 4 - Herring in a seine pocket, and the results of a night's stop-off in the large seine-enclosed area. On the right, the seine twine is "ballooned" by the incoming tide. Location, north side of Great Mark Island, Casco Bay, Maine.

TYPES OF AIRCRAFT AND EQUIPMENT

The type of aircraft most preferred and used in aerial scouting work is the light aircraft of high-wing monoplane design with a tandem seating arrangement, allowing observation from either side of the aircraft. The aircraft are powered by a 4 or 6 cylinder opposed-piston engine having a horsepower range of 65 to 150. Several commercial aircraft designs have certain important features that lend themselves to fish spotting. In general, they are, low-stalling speed, inherent stability, good visibility, and relatively low maintenance and cost of operation.

The cost of light aircraft now in use by the commercial fish spotter may range from $2,000 to $12,000 depending on the age and condition of the engine and airframe, and if new or used. A new aircraft of the type described in the following specifications, equipped with floats, radio communications, and navigational equipment, would cost about $12,000.

Helicopters have been used experimentally for commercial fish spotting; however, the helicopter's high initial and operating costs have discouraged its use in most commercial fishing operations. The continued development of the helicopter will in the future result in construction of an economical machine, probably of the one-man type, that will see widespread use by the commercial fishing fleet. A small helicopter of the one-man type could be operated from the fishing vessel and would be very useful in oceanic fisheries that range long distances from shore-based aircraft.

In recent years, reliable radio communication equipment has been developed allowing direct contact between the fishing vessel and the aircraft. This is in contrast with communications systems experimented with in the earlier days of fish spotting. Such methods as wig-wagging the wings and heading the aircraft in the direction of the fish school; flying low over the fishing vessel, cutting the engine, and yelling directions; diving on the school; dropping empty milk cartons or floats on the school; signaling with a system of colored lights--these have been replaced with an efficient plane-to-boat electronic communications system. Radio frequencies in the high frequencies and very-high frequencies (VHF) are most commonly used. Equipment may range from elaborate VHF communications systems between the shore plant, fishing vessels, and spotter aircraft, to simple systems between the plane and vessel using the marine frequencies of 2738 kilocycles. Citizen band units on a frequency of 27 megacycles are in use, and though range is limited, it does provide a near-private means of giving fishing information.

Most aircraft used in overwater fish spotting operations are equipped with wheels and can be operated only from a land airport. Land-based aircraft are easier to maintain than are float-equipped aircraft operating from a salt-water base, because of the elimination of the corrosion problem. Also, in most areas service facilities for land-based aircraft are common but seaplane service facilities are almost non-existent. Float-equipped aircraft are commonly found in the Gulf of Mexico menhaden fishery and the Maine herring fishery (see fig. 5). The cost of float-equipped aircraft is about $2,800 more than that of wheel-equipped aircraft. However, the ability to make a forced landing on water with float aircraft, versus a landing on water with a wheel-equipped type is a factor that must be evaluated by the personnel who

Fig. 5 - Float-equipped aircraft of a type used in fish spotting.

fly the aircraft. In most cases, wheel landing on water will result in overturn of the aircraft, damage, and usually complete loss by sinking.

Typical specifications of light aircraft used in fish spotting are:

Design - High-wing monoplane, two-place (tandem seating).
Engine - 4-cylinder opposed, 150 B. hp. @ 2,700 r.p.m. engines may range from 65 to 160 B. hp.
Gross weight - 1,750 lbs.
Empty weight - 930 lbs.
Useful load - 820 lbs.
Wing span - 35 ft.
Cruising speed - 113 m.p.h. (75% power).
Stalling speed - 45 m.p.h. (flaps extended).
Fuel capacity - 36 U. S. gallons.
Fuel consumption - 9 U. S. gals./hr. (75% power).
Cruising range - 460 miles (75% power).

Conventional light aircraft are sometimes modified to carry large quantities of fuel giving 12 or more hours of flight duration.

Radio equipment usually includes a marine-band transmitter-receiver, a citizen-band set, or both, and an aircraft VHF navigation-communications set capable of omni-reception. An A.D.F. (automatic direction finder) may be included in some cases.

Instrumentation, in addition to the basic flight and engine instruments, may consist of a full panel allowing operation of the aircraft under I.F.R. (instrument flight rules) conditions. Aircraft operating in the offshore areas, and at night, are usually so equipped.

HAZARDS OF OPERATION

Aside from the hazard of power failure, which would result in a forced landing, there is the hazard of mid-air collision. During the past five years, records indicate that in the Middle Atlantic and New England areas there have been at least seven fatalities resulting from mid-air collisions between aircraft conducting fish-spotting operations. A mid-air collision between a fish-spotter aircraft and a military jet in North Carolina, and off southern California a missing aircraft and an unexplained crash into the sea, has resulted in additional fatalities.

Aerial fish spotting requires the concentration of the pilot, not only upon flying the aircraft but in searching below and to the side of the aircraft for signs of schooling fish. Once the fish are found, it is of necessity that the pilot closely observe the fish during a circling procedure while waiting for the seiner to arrive at the proper position before setting the net, and when setting the net. The attention required of the pilot to search and direct the fishing vessel reduces the amount of attention that the pilot can give to other air traffic.

In an effort to eliminate or cut down on the hazard of mid-air collision, the commercial fishing industry has, in areas where fatalities have occurred, developed safety rules for fish-spotting operations. These rules are agreed upon by the companies and pilots involved, and operate successfully only through the cooperation of the pilots. In 1959, as a result of a mid-air collision accounting for three fatalities in 1958, companies and pilots in the Gloucester, Mass., area, in cooperation with the U. S. Bureau of Commercial Fisheries developed the following voluntary rules. These rules were in part based on those developed by companies and spotter pilots in the Chesapeake Bay area after a fatal accident in 1956. The cooperative safety rules are:

1. Working altitudes as specified will be adhered to: 0 - 1,500 feet, Company A, Gloucester, Mass., 2,000 feet plus, Company B, Gloucester, Mass.; or at ceilings below 2,000 feet a minimum altitude separation of 300 feet will be maintained between aircraft.

2. All fish-spotter pilots will set their altimeters to the barometric pressure (altimeter setting) each morning at time of take-off.

3. No formation or acrobatic flying over the fishing areas.

I certify and agree that the foregoing rules have been accepted by the companies and pilots involved in aerial fish-spotting operations and that the boat captains operating in cooperation with the pilots have been made aware of these rules and that all conditions set forth herein will be complied with. I further agree that the acceptance of these rules does not in any manner alleviate the pilot for compliance with all pertinent Federal Air Regulations.

(signed by company representatives and pilots)

VALUE TO THE INDUSTRY

The fish spotter's value to those commercial fisheries dependent upon seining pelagic schooling fish... is well established and, in many cases, fishing vessel operators are reluctant to venture to the fishing grounds unless an aircraft has scouted the area and can give current information on the location of schooling fish. Fish-spotting pilots contend that unless fish are spotted from the air, it is useless for commercial fishing vessels to attempt scouting. But weather conditions resulting in low ceilings and poor visability is one of the few times when surface observations from a fishing boat is the only way to spot schooling fish. The resulting increase in fishing efficiency from the use of aircraft has not been fully appreciated by the commercial fishing industry in general, as aircraft are not usually thought of as having an important part in commercial fishing. In southern California it has been estimated by one of the more experienced fish-spotting pilots that each active fish-spotting aircraft is responsible for directing fishing operations resulting in the catch of at least 20,000 tons of sardines, mackerel, and other species during a season. Aircraft used in fish spotting are sometimes owned by the fishing vessel or processor, and pilots are hired on a monthly or seasonal basis at a flat rate. In other cases, the aircraft are independently-owned and spot for the commercial fishing vessels on a share basis, or for a company on a fixed rate. For example, in the southern California purse-seine fishery, it is reported that the fee for the spotting service is five percent of the gross ex-vessel sale of the catch on a long-term contract, or seven percent of the individual catch when not under contract. In other areas, fees have been reported to be 1 to $1\frac{1}{2}$ shares of the vessel's gross stock. The number of fishing vessels that can be properly serviced by one spotter aircraft is 4 to 5.

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EFFECTS OF SOME PESTICIDES ON EGGS AND LARVAE OF OYSTERS (CRASSOSTREA VIRGINICA) AND CLAMS (VENUS MERCENARIA)

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SUMMARY

The effects of several concentrations of 31 compounds, on egg development and survival and growth of bivalve larvae, have been determined. Some compounds were tested on eggs and larvae of both oysters, Crassostrea virginica, and clams, Venus mercenaria (Mercenaria mercenaria), but the majority were tested on only one or the other of these species of bivalves. The compounds included were 14 insecticides, 4 weedicides, 4 oils and organic solvents, and 9 compounds that are used as antibiotics, bactericides, or disinfectants.

Within each group of compounds there were great differences in toxicity to bivalve larvae. Thus DDT, one of the most toxic of the commonly used insecticides, at a concentration of 0.05 parts per million (p.p.m.), caused over 90 percent mortality of oyster larvae and almost completely prevented growth, whereas growth of clam larvae in 5.0 p.p.m. of lindane, the least toxic of the commonly used insecticides, was somewhat faster than that of larvae in control cultures. Even at 10.0 p.p.m., essentially a saturated solution of lindane, there was no appreciable mortality of clam larvae. It is suggested that, in enclosed bodies of water, lindane could possibly be used to control crustaceans without harming bivalve larvae or their food organisms.

Certain concentrations of sulmet, phenol, chloramphenicol, and dowicide "A," among the antibiotic, bactericide, and disinfectant compounds, improved the rate of growth of larvae appreciably. This is attributed to the inhibition of growth of toxic bacteria. Acetone and trichlorobenzene among the solvents, monuron and fenuron among the weedicides, and lindane and guthion among the insecticides, at certain concentrations, also improve the rate of growth of larvae to some extent and it is suggested that these compounds may also partially inhibit toxic bacteria.

With almost every compound tested, slowing of the rate of growth of larvae was the first evidence of toxicity. Appreciable mortality usually occurred only when concentrations were increased enough to reduce the rate of growth by 50 percent or more.

BACKGROUND

Work on the effects of antifungal and antibacterial agents was started at Milford Laboratory several years ago in an attempt to find compounds that could be used routinely under laboratory or hatchery conditions to control fungi and bacteria known to be pathogenic or toxic to larvae of oysters, Crassostrea virginica, and clams, Venus mercenaria (Mercenaria mercenaria). Our earlier work on the effects of some antibiotics on these larvae has been reported along with the effects of some other dissolved substances (Davis and Chanley 1955). Walne (1958a, 1958b, 1959) has emphasized the harmful effects of bacterial growths in laboratory cultures of larvae of European oysters (Ostrea edulis) and described his results using antibiotics and ultraviolet light to control bacteria in these cultures.

In the present series of experiments we have tested several additional bactericides and fungicides and some of the compounds evaluated for use in combating shellfish predators. In response to requests for information on the effects, on oysters and clams of different ages, of pesticides used in marsh areas to control mosquitoes, other insects, weeds and brush, we have expanded this work to include the effects of some common insecticides and weedicides.

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Doudoroff et al (1953) from laboratory tests of soils collected from toxaphene-treated fields have concluded that stream waters can be rendered toxic to fish by drainage from such fields and state "application of some of these insecticides to crops apparently has resulted in serious pollution of streams and reservoirs into which these materials have been washed from the soil by heavy rains" (page 840). Harrington and Bidlingmayer (1958) made observations of a salt marsh in Florida following aerial treatment with dieldrin that averaged 0.13 to 0.4 parts per million (p.p.m.) of the active ingredient depending on depth of water. They state "the fish kill was substantially complete" but that "mollusks (snails, nudibranchs, tethyoids, and oysters) seemed to be unharmed by dieldrin. Crustaceans were virtually exterminated throughout the area" (page 81). Hooper (1959) has reported that toxaphene at 0.1 p.p.m. used in two Michigan fresh-water lakes, in addition to killing fish, seemed to kill most of the invertebrates except mollusks and oligochaetes.

The results reported in this article have been obtained over a period of several years. Many of the compounds have been tested at a series of concentrations in only a single experiment. In each case, however, the results represent the average of duplicate cultures at each concentration and, in most cases, both the agreement between duplicate cultures and the gradation of effect with increasing concentration of the substance tested indicate the reliability of the results. Since the compounds vary widely in their toxicity to larvae, the range of concentrations tested is not the same for all compounds.

The tests have been run using our standard methods of larval culture (Davis 1953) which include ultraviolet treatment of all sea water used. A series of one-liter cultures in 1,500 ml. pyrex beakers was used. All the cultures were kept in the same constant temperature bath and each culture received an equal quantity of the same foods each day. In testing the effects on egg development an equal number of eggs was placed in each beaker of the series. One pair of these cultures served as controls and an additional pair was used for each concentration of the compounds to be tested. Quantitative samples were taken 48 hours after fertilization to determine the number of eggs that had developed to the straight hinge larval stage. The results are given as the relative percentage (R) of eggs developing to the straight hinge stage calculated as follows:

$$R = \frac{\text{Average number of larvae in experimental cultures}}{\text{Average number of larvae in control cultures}} \times 100$$

Due to errors inherent in the setting up of cultures and sampling, the percentage of eggs developing to straight hinge larval stages and the survival percentages are accurate only to about ±10 percent. Differences of less than 20 percent are, therefore, of doubtful significance.

The effect of the compounds on survival and growth of larvae was tested using larvae that had developed to the straight hinge stage (48 hours) under normal conditions. An equal number of these larvae was placed in each of a series of beakers. Two such beaker cultures were used as controls and two were used for each concentration of the compounds to be tested. Quantitative samples were taken only on the 12th day in experiments using clam larvae, and on the 14th day in experiments using oyster larvae. Nevertheless, the larvae were examined, and their condition and the estimated mortality noted, every second day when the sea water in the cultures was changed and the different concentrations of the toxicants reestablished. Growth (G), expressed as a percentage of that in control cultures, was calculated as follows:

$$G = \frac{\text{Mean length of experimental larvae - mean length at 48 hours}}{\text{Mean length of control larvae - mean length at 48 hours}} \times 100$$

Mortality is shown only in those instances where it was obviously significant. A list of the chemicals tested, with their chemical names and solubilities, where known, is given in Appendix I (see page 10).

BACTERICIDES AND DISINFECTANTS

Although oyster larvae appear to be more susceptible to toxins produced by algae and bacteria than are clam larvae, only rarely have we observed bacteria or fungi that appeared

Appendix I

Common Name	Chemical Name	Solubility in Water and Org. Solvents
INSECTICIDES:		
Aldrin	hexachloro hexahydro-endo, exo dimethanonaphthalene	insol. in H_2O (?) 1,590,000 p.p.m. in acetone
Niagara Compound N-3452	alkyl (C_8-C_{18}) dimethyl benzyl ammonium chloride	
Niagara Compound N-3514	2-chloro-1-nitropropane	8,000 p.p.m. in H_2O
DDT	1, 1, 1-trichloro-2, 2-bis(p-chlorophenyl) ethane	0.0002 p.p.m. in H_2O 0.2 p.p.m. as colloid 590,000 p.p.m. in acetone
Dicapthon	O-O-dimethyl-O (2 chloro-4 nitrophenyl) phosphorothioate	very low sol. in H_2O (?) v. s. in acetone
Dieldrin	hexachloro epoxy octahydro-endo, exo dimethanonaphthalene	insol. in H_2O (?) 540,000 p.p.m. in acetone
Dipterex	O, O-dimethyl-1-hydroxy-2, 2, 2 trichloroethyl phosphonate	130,000 p.p.m. in H_2O
Endrin	hexachloro epoxy octahydro-endo, endo-dimethanonaphthalene	(?)
Guthion	O, O-dimethyl-S-(4 oxobenzotriazino-3 methyl) phosphorodithioate	33 p.p.m. in H_2O
Lindane	1, 2, 3, 4, 5, 6 hexachlorocyclohexane	10 p.p.m in H_2O 440,000 p.p.m. in acetone
Parathion	O, O-diethyl-O-p-nitrophenyl thiophosphate	20 p.p.m. in H_2O
Tepp	tetraethyl pyrophosphate	misc. in H_2O (hydrolyzes) misc. in acetone
Toxaphene	mixture of polychloro bicyclic terpenes with chlorinated camphene predominant	1.5 p.p.m. in H_2O 4,500,000 p.p.m. in acetone
Sevin	1 naphthyl-N-methylcarbamate	1,000 p.p.m. in H_2O 300,000 p.p.m. in acetone
WEEDICIDES:		
Diuron	3-(3, 4-dichlorophenyl)-1, 1-dimethylurea	42 p.p.m. in H_2O
Fenuron	3 phenyl-1, 1-dimethylurea	2,900 p.p.m. H_2O
Monuron	3-(p-chlorophenyl)-1, 1-dimethylurea	230 p.p.m. in H_2O
Neburon	1-n-butyl-3-(3, 4-dichlorophenyl)-1-methylurea	4.8 p.p.m. in H_2O
OILS & SOLVENTS:		
Acetone	acetone	misc. in H_2O
Allyl alcohol	2 propene-1-o1	misc. in H_2O
O-dichlorobenzene	o-dichlorobenzene	130 p.p.m. in H_2O misc. in acetone
Trichlorobenzene	trichlorobenzene	25 p.p.m. in H_2O misc. in acetone
ANTIBIOTICS & BACTERICIDES:		
Chloramphenicol	(chloromycetin) D-(-)-threo-2-dichloroacetamido-1-p nitrophenyl -1, 3-propanediol	2,500 p.p.m. in H_2O v.s. in acetone
Delrad (algacide)	dehydro-abietylamine acetate	v.s. in water
Dowicide "A"	sodium-o-phenylphenate . 4 H_2O	1,220,000 p.p.m. in H_2O
Dowicide "G"	sodium pentachlorophenate	330,000 p.p.m. in H_2O
Nabam	disodium ethylene bis(dithiocarbamate)	v.s. in water
Nemagon	1, 2-dibromo-3-chloropropane	1,000 p.p.m. in H_2O
Phenol	phenol	v.s. in H_2O
Roccal	alkyl(C_8H_{17}-$C_{18}H_{37}$) dimethylbenzyl ammonium chloride	10% solution v.s. in H_2O
Sulmet	(sodium sulfamethazine) 2-sulfanilimido, 4-6-dimethyl pyrimidine sodium	v.s. in H_2O

to be actively pathogenic to oyster larvae. By contrast, clam larvae are frequently seen that appear to have been invaded by active pathogens. In the tests of bactericides and disinfectants we have consequently used clam larvae, although some of these compounds have subsequently been used successfully to control bacteria that produce metabolites harmful to oyster larvae. Since the effects of toxic or pathogenic bacteria and fungi usually do not appear until after eggs have developed into shelled larvae, some of the compounds, earlier in the program, were not tested for their effect on egg development.

The effects of four bactericides (phenol, roccal, dowicide "A," and dowicide "G"), a soil fumigant (nemagon), and a fungicide (nabam) on development of clam eggs indicate the great differences between these compounds (fig. 1). Thus, nabam and dowicide "G" prevented normal development of clam eggs at each concentration tested. Roccal at a concentration of 0.1 p.p.m. permitted normal development, at 0.2 p.p.m. it reduced the number of normal larvae

by 55 percent and at 1.0 p.p.m. and higher concentrations it entirely prevented normal egg development. In contrast to these highly toxic compounds dowicide "A" and nemagon permitted a normal percentage of clam eggs to develop in concentrations up to 5.0 p.p.m., and phenol was not toxic at concentrations below 10.0 p.p.m. At low concentrations (0.025 to 0.2 p.p.m.) phenol, possibly through a slight bacteristatic effect, appeared to have increased the percentage of clam eggs developing normally.

While the compounds still had the same general order of toxicity, when tested on survival and growth of clam larvae, certain differences were apparent (fig. 2). Dowicide "G" was again lethal at all concentrations tested but nabam, which entirely prevented normal egg development at all concentrations, did not significantly affect survival of larvae through the 12 days of the experiment at concentrations of 0.5 and 1.0 p.p.m. although it did almost completely prevent growth. Roccal, dowicide "A," and nemagon conversely appeared to be

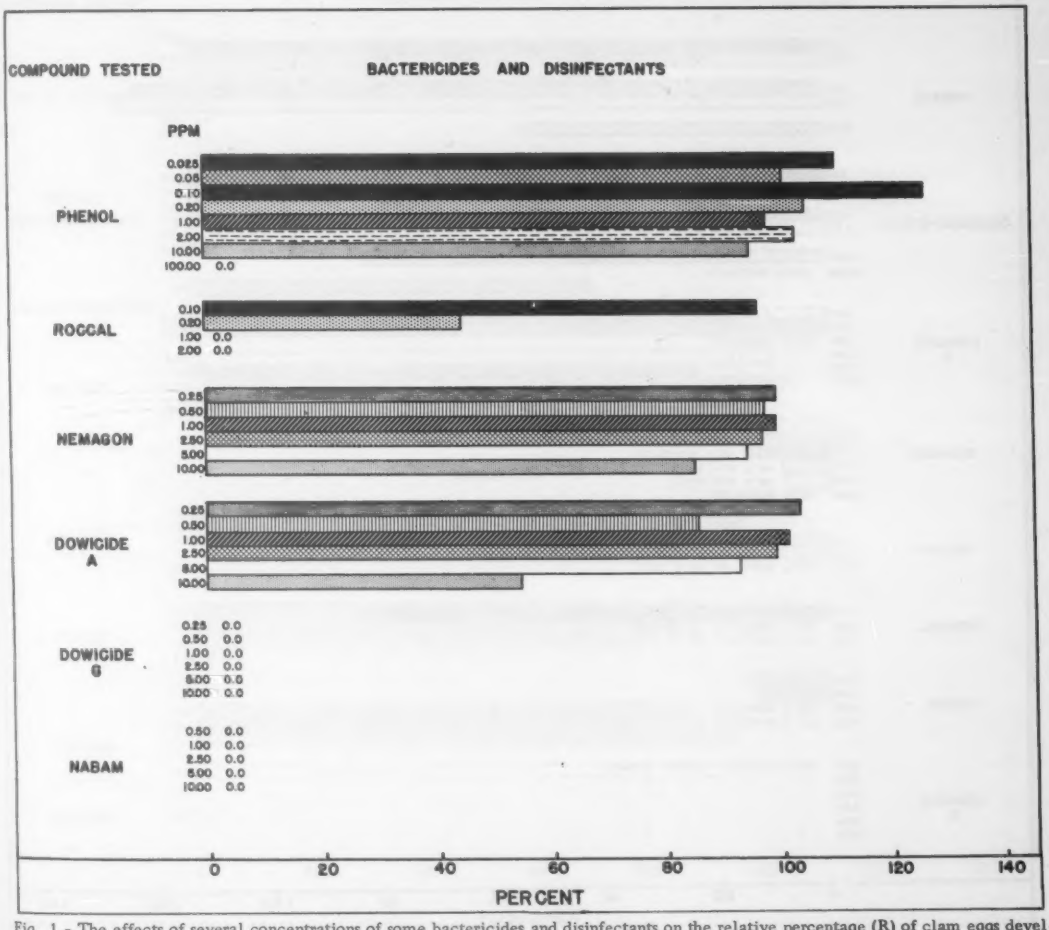

Fig. 1 - The effects of several concentrations of some bactericides and disinfectants on the relative percentage (R) of clam eggs developing to the straight hinge stage. The percentages shown are averages of duplicate cultures at each concentration calculated as follows:

$$R = \frac{\text{average number of larvae in experimental cultures}}{\text{average number of larvae in control cultures}} \times 100$$

more toxic to larvae than to the eggs, i.e. some eggs developed in 0.2 p.p.m. of roccal, but this concentration eventually killed all larvae. Similarly, although a normal percentage of eggs developed to straight hinge larval stages in 5.0 p.p.m. of dowicide "A," all concentrations of 1.0 p.p.m. and over were lethal to larvae.

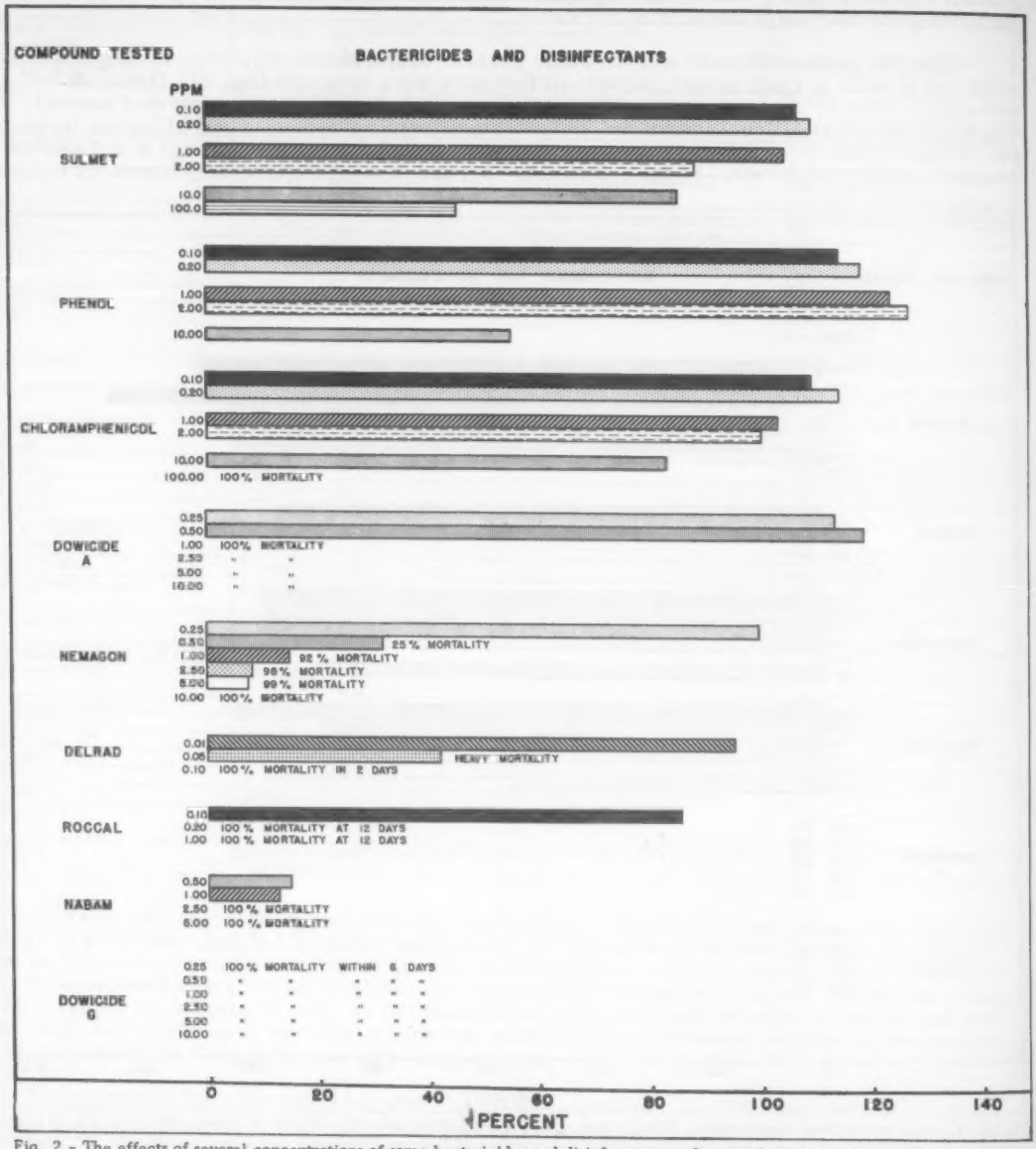

Fig. 2 - The effects of several concentrations of some bactericides and disinfectants on the growth of clam larvae. The percentages (G) plotted are averages of duplicate cultures at each concentration calculated as follows:

$$G = \frac{\text{mean length of experimental larvae at 12 days - mean length at 48 hours}}{\text{mean length of control larvae at 12 days - mean length at 48 hours}} \times 100$$

Likewise, nemagon even at 10.0 p.p.m. did not seriously affect egg development, but growth and survival of larvae were normal only at 0.25 p.p.m.; all higher concentrations drastically reduced growth and survival. Delrad, an algacide, was also quite toxic to larvae at concentrations high enough to be an effective algacide. Phenol, at 10.0 p.p.m., although it had little effect on eggs, significantly reduced the rate of growth of clam larvae. At lower concentrations, however, phenol along with low concentrations of dowicide "A" and certain concentrations of sulmet and chloramphenicol increased the rate of growth of clam larvae significantly above that of larvae in control cultures. Nevertheless, even with these compounds too high a concentration can significantly reduce growth and survival of clam larvae (fig. 2).

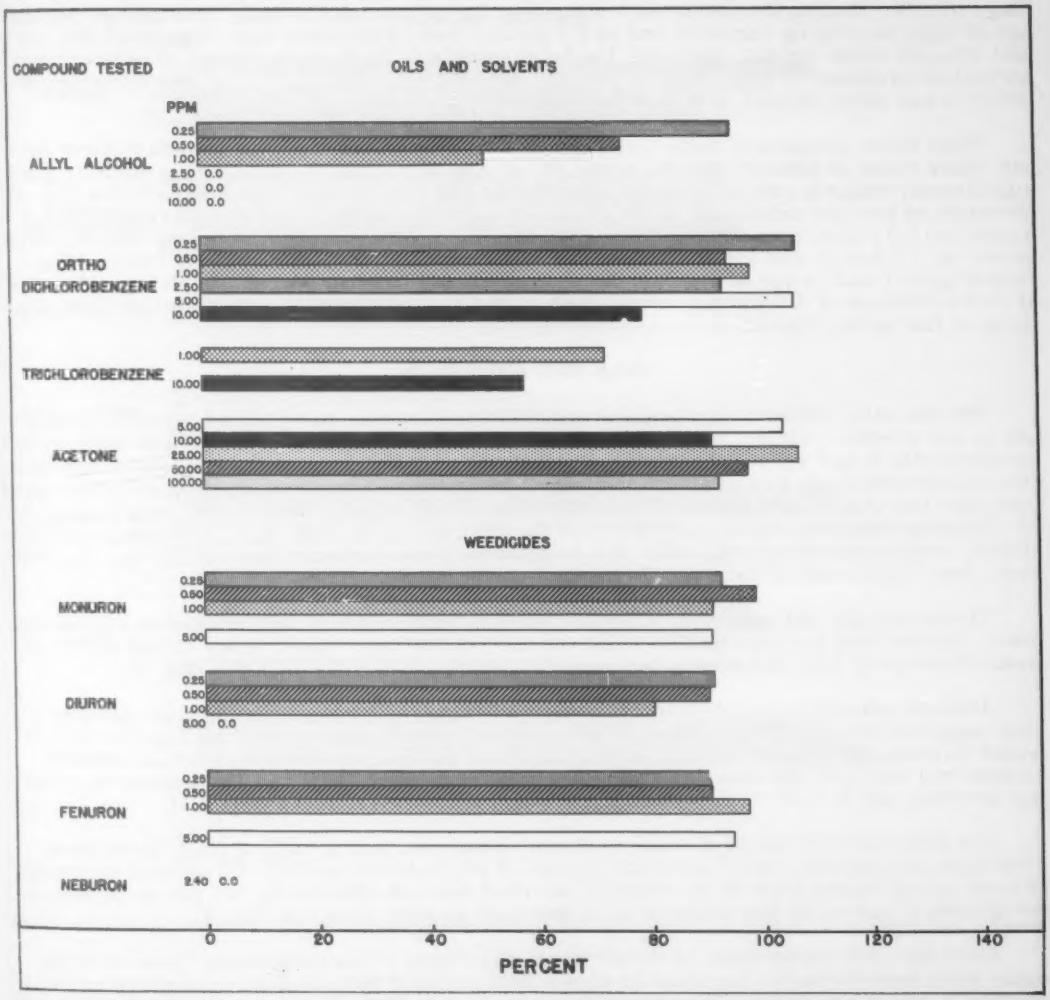

Fig. 3 - The effects of several concentrations of oils, solvents and weedicides on the relative percentage (R) of clam eggs developing to the straight hinge stage. The percentages shown are averages of duplicate cultures at each concentration calculated as follows:

$$R = \frac{\text{average number of larvae in experimental cultures}}{\text{average number of larvae in control cultures}} \times 100$$

Sulmet is now used routinely at our laboratory to prevent growth of harmful bacteria in larval cultures, and phenol, chloramphenicol, and perhaps even dowicide "A" can be used in conjunction with other antibiotics to aid in control of epidemics caused by bacteria not amenable to control with sulmet.

WEEDICIDES

The weedicides tested all belong to the methyl urea group of compounds but differ greatly in their solubilities and in their toxicity to clam eggs and larvae. Fenuron and monuron are the most soluble (Appendix I) and were the least toxic. Neither, in concentrations up to 5.0 p.p.m., significantly affected the percentage of clam eggs reaching the straight hinge stage (fig. 3). Diuron (solubility 42.0 p.p.m.) at 1.0 p.p.m. significantly reduced the percentage of eggs developing normally and at 5.0 p.p.m. none of the clam eggs developed into normal straight hinge larvae. Neburon, the least soluble (4.8 p.p.m. in water), also prevented normal development of clam eggs at the only concentration tested (2.4 p.p.m.; saturated solution in sea water diluted with an equal volume of sea water).

When these compounds were tested for their effect on survival and growth of clam larvae, their order of toxicity was the same as for egg development. The larvae actually grew significantly better in each of the four concentrations of fenuron than in control cultures (fig. 4). Monuron, at low concentrations, likewise increased the rate of growth of clam larvae but at 1.0 p.p.m. and 5.0 p.p.m. gave some evidence of being toxic. Diuron did not seriously interfere with growth at 1.0 p.p.m. and lower concentrations but at 5.0 p.p.m. it drastically reduced the rate of growth and in one of the pair of cultures caused over 90 percent mortality. Neburon at concentrations of 2.4 and 4.8 p.p.m. (only concentrations tested) caused 100 percent mortality of the larvae (fig. 4).

OILS AND SOLVENTS

The two oils, orthodichlorobenzene and trichlorobenzene, were tested because of their use in our predator control work (Loosanoff et al 1960). Both are relatively insoluble in water (Appendix I) and were comparatively harmless to clam larvae at the concentrations tested. Orthodichlorobenzene had no significant effect on egg development at any concentration tested less than 10.0 p.p.m. and even at this concentration the reduction was barely significant (fig. 3). Trichlorobenzene significantly reduced the percentage of clam eggs developing normally at both concentrations tested. Even at a trichlorobenzene concentration of 10.0 p.p.m., however, over 50 percent of the eggs did develop normally.

These two oils had even less effect on survival and growth of larvae than on egg development. Neither had any appreciable effect on survival at the concentrations tested and in all concentrations of both oils larvae had reached setting size by the 12th day (fig. 4).

Acetone and allyl alcohol, commonly used solvents, differed greatly in their toxicity to clam eggs and larvae. The percentage of eggs developing normally was not significantly affected by concentrations of acetone as high as 100.0 p.p.m., while even 1.0 p.p.m. of allyl alcohol was sufficient to cause an approximate 50 percent reduction in the number developing normally and 2.5 p.p.m. completely prevented normal development (fig. 3).

The difference in effects if these solvents on survival and growth of clam larvae was even more pronounced; as little as 0.25 p.p.m. of allyl alcohol caused 100 percent mortality of clam larvae within eight days, whereas survival was not affected by 250 p.p.m. of acetone and growth of larvae at this concentration was only slightly retarded (fig. 4).

Since the tests on acetone, stock solutions of several of the compounds "insoluble" in water have been made up in acetone in concentrations such that the final concentration of acetone in any larval culture would be 100 p.p.m. or less. Tests on nemagon, aldrin, toxaphene, and sevin were run in this manner, which insures that the correct quantity of the toxicant is added to the culture even though it may not all stay in solution in the sea water.

In tests with nemagon and sevin (solubility of both 1,000 p.p.m. in water) results were the same whether the stock solutions were made up in water or in acetone.

INSECTICIDES

The effects of twelve insecticides, on survival and growth of bivalve larvae, have been tests. Six of these (guthion, sevin, lindane, toxaphene, aldrin, and dicapthon), together with Niagara Compound N-3514 (2-chloro-1-nitropropane) have been tested on clam eggs (fig. 5) and larvae (fig. 6). Seven, including guthion, parathion, DDT, dipterex, TEPP, dieldrin, and

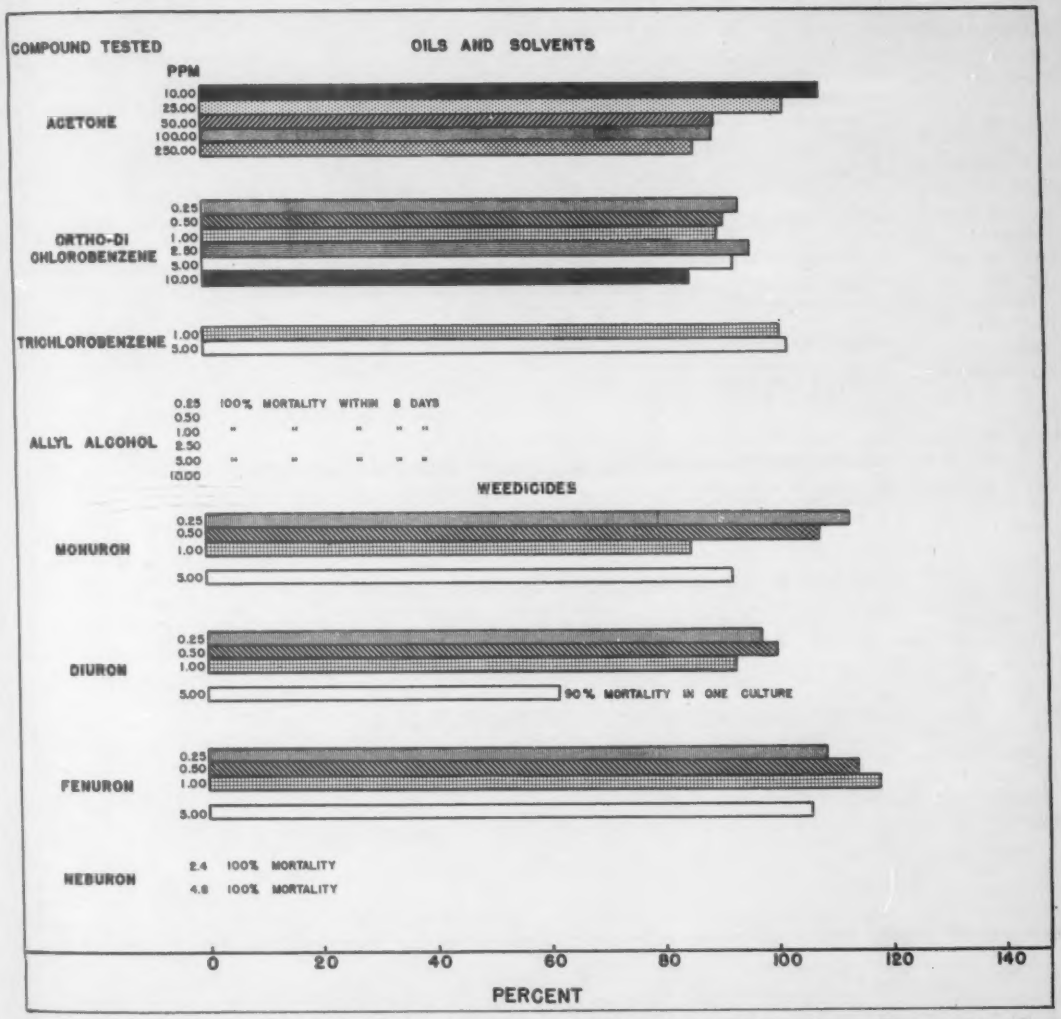

Fig. 4 - The effects of several concentrations of oils, solvents, and weedicides on the growth of clam larvae. The percentages (G) plotted are averages of duplicate cultures at each concentration calculated as follows:

$$G = \frac{\text{mean length of experimental larvae at 12 days - mean length at 48 hours}}{\text{mean length of control larvae at 12 days - mean length at 48 hours}} \times 100$$

endrin, together with Niagara Compound N-3514 and Niagara Compound N-3452 [alkyl (C_8C_{18}) dimethyl benzyl ammonium chloride] have been tested for their effect on survival and growth of oyster larvae (fig. 8). Guthion, endrin, dieldrin, TEPP, sevin, lindane, and Niagara Compounds N-3514 and N-3452 have also been tested on oyster eggs (fig. 7).

Lindane was the least toxic, to bivalve eggs and larvae, of any of these compounds. Approximately 60 percent of the clam eggs and 43 percent of the oyster eggs developed normally in concentrations of lindane up to 10 p.p.m., which is essentially a saturated solution. Moreover, there was no appreciable mortality of clam larvae receiving this concentration of

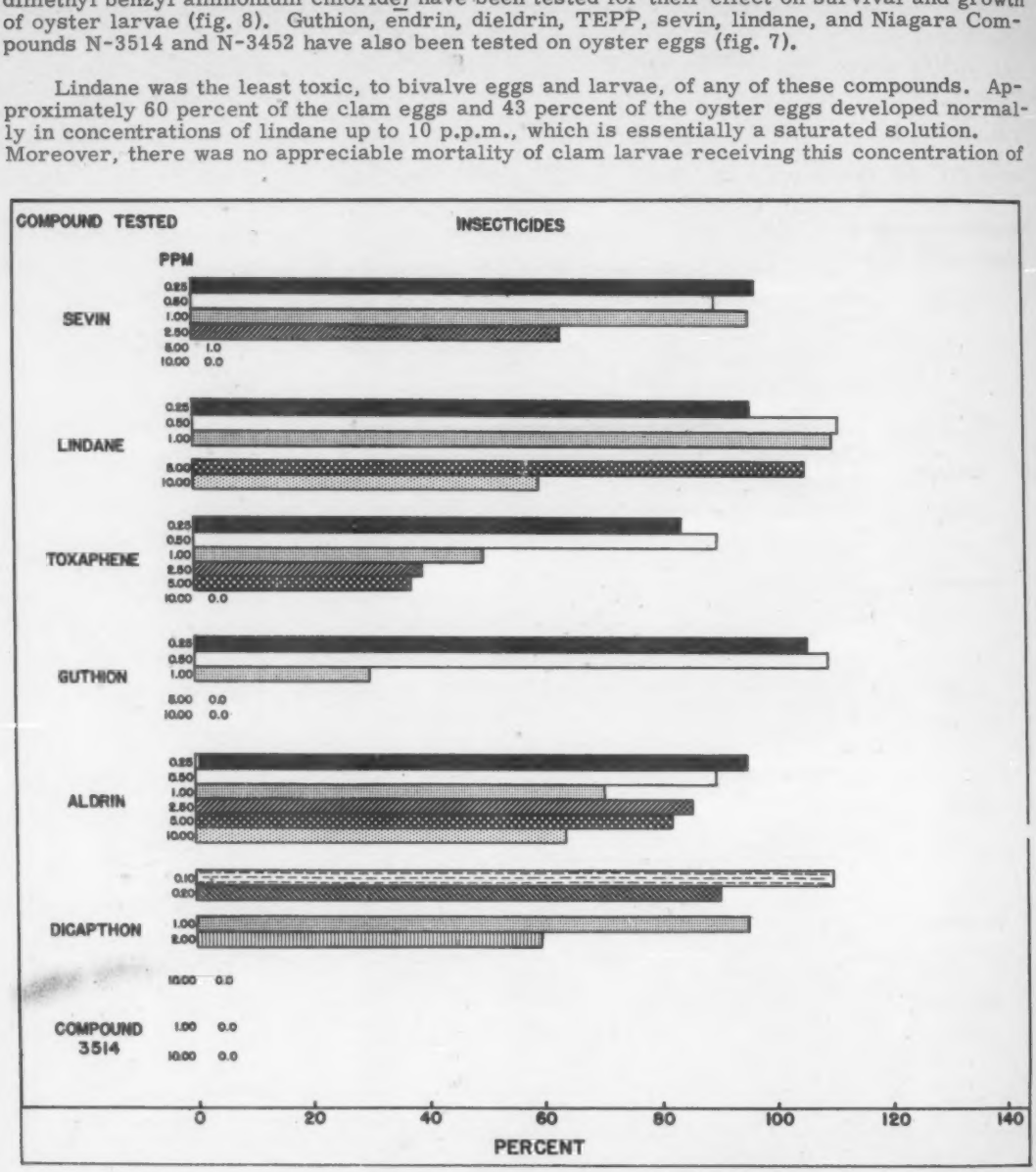

Fig. 5 - The effects of several concentrations of some insecticides on the relative percentage (R) of clam eggs developing to the straight hinge stage. The percentages shown are averages of duplicate cultures at each concentration calculated as follows:

$$R = \frac{\text{average number of larvae in experimental cultures}}{\text{average number of larvae in control cultures}} \times 100$$

lindane routinely, although growth of these larvae was significantly reduced (fig. 6). Concentrations of 5 p.p.m. or lower had little or no effect on development of clam or oyster eggs or on survival and growth of clam larvae (effect on oyster larvae not tested).

Aldrin did not appear to be very toxic to clam eggs, i.e. 64 percent developed normally at 10.0 p.p.m. (fig. 5). When aldrin was tested on clam larvae, however, it proved to be quite toxic. Growth of clam larvae was almost completely stopped by aldrin concentrations of 0.25 p.p.m. and 0.5 p.p.m. although there was no appreciable mortality of larvae at these concentrations. At all higher concentrations of aldrin, however, mortality was essentially 100 percent (fig. 6). Doudoroff et al (1953) report that the 10-day TLM (the median tolerance limit at which just 50 percent of the fish survive) for goldfish is about 0.02 p.p.m. of aldrin.

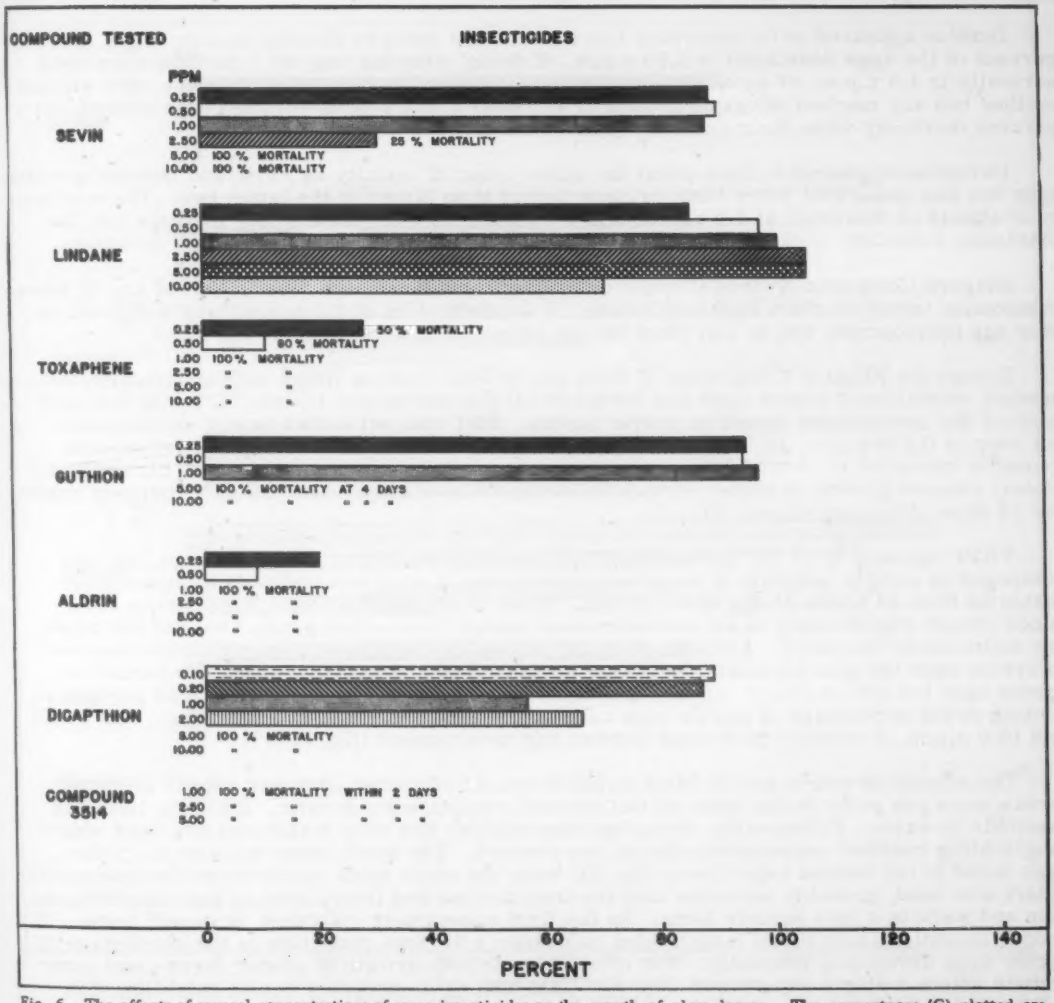

Fig. 6 - The effects of several concentrations of some insecticides on the growth of clam larvae. The percentages (G) plotted are averages of duplicate cultures at each concentration calculated as follows:

$$G = \frac{\text{mean length of experimental larvae at 12 days - mean length at 48 hours}}{\text{mean length of control larvae at 12 days - mean length at 48 hours}} \times 100$$

Toxaphene, likewise, was more toxic to clam larvae than might be expected from its effect on clam eggs. Some eggs developed normally in concentrations up to 5.0 p.p.m. of toxaphene and egg development appeared to be entirely normal at 0.25 and 0.50 p.p.m. Since the solubility of toxaphene is presumably 1.5 p.p.m., the increasing toxicity to clam eggs at 2.5, 5.0 and 10.0 p.p.m. possibly indicates that some of the other components of this mixture reach toxic levels as the concentration is increased above 1.5 p.p.m. When clam larvae were kept in solutions of toxaphene, however, 0.25 p.p.m. was sufficient to reduce growth of the larvae drastically and to cause a 50 percent mortality. Some larvae survived 12 days in 0.50 p.p.m. but growth of these larvae was negligible. Doudoroff et al (1953) report the 10-day TLM for goldfish is somewhat below 0.005 p.p.m. of toxaphene. As already noted, Hooper (1959) reports that in lakes treated with 0.1 p.p.m. fish and most invertebrates, except mollusks and oligochaetes, seem to have been killed.

Guthion appeared to be somewhat more toxic than sevin to developing clam eggs, i.e. 64 percent of the eggs developed in 2.50 p.p.m. of sevin, whereas only 30.5 percent developed normally in 1.0 p.p.m. of guthion. Their effects on clam larvae, however, were very similar; neither had any marked effect on growth or survival at 1.0 p.p.m. although both caused 100 percent mortality when their concentrations were increased to 5.0 p.p.m.

Dicapthon appeared to have about the same order of toxicity as sevin and guthion on clam eggs but was somewhat more toxic to clam larvae than either of the latter two. The similarity of effects of dicapthon at 1.0 p.p.m. and 2.0 p.p.m. on clam larvae may indicate that the maximum solubility of this compound is about 1.0 p.p.m. (solubility "very low" in water).

Niagara Compound N-3514 (2-chloro-1-nitropropane) was the most lethal of any of these compounds tested on clam eggs and larvae. A concentration of 1.0 p.p.m. was sufficient to stop egg development and to kill clam larvae within two days.

Except for Niagara Compounds N-3514 and N-3452, both of which caused virtually 100 percent mortality of oyster eggs and larvae at all concentrations tested, DDT was the most toxic of the insecticides tested on oyster larvae. DDT was not tested on egg development, but even at 0.025 p.p.m. DDT drastically reduced the rate of growth of oyster larvae and caused a mortality of about 20 percent. At a concentration of 0.05 p.p.m. DDT almost completely stopped growth of oyster larvae and caused a mortality in excess of 90 percent within the 14 days of the experiment (fig. 8).

TEPP appears to be the least toxic of the insecticides tested on oyster eggs, but this compound is notably unstable in water solution and most of it was undoubtedly hydrolyzed within the first 24 hours of egg development. When used routinely on oyster larvae it reduced growth significantly at all concentrations tested (1.0 to 10.0 p.p.m.) but did not cause any appreciable mortality. Lindane, as mentioned previously, was also relatively nontoxic to oyster eggs but was not tested on oyster larvae. Sevin, the other insecticide tested on oyster eggs but not on oyster larvae, at a concentration of 1.0 p.p.m. caused a 40 percent reduction in the percentage of oyster eggs reaching the normal straight hinge stage, and at 5.0 and 10.0 p.p.m. it entirely prevented normal egg development (fig. 7).

The effects of endrin and dieldrin on development of oyster eggs and growth of oyster larvae were run prior to the tests on acetone and results were erratic. Both are listed as insoluble in water. Presumably, these two insecticides are very stable and are used where long-lasting residual insecticidal effects are desired. The much lower toxicity to oyster eggs noted in the second experiment (fig. 7), when the same stock suspension (now two weeks older) was used, probably indicates that the insecticides had flocculated in the stock suspension and were in a less soluble form. As the first experiment indicated, however, under proper conditions both these insecticides can cause a serious reduction in the percentage of oyster eggs developing normally. The effect of endrin on growth of oyster larvae was also erratic within a single experiment (fig. 8). This was again probably due to solubility difficulties and failure to get a uniform suspension in the different test beakers.

Dipterex was not tested on oyster eggs, but caused a significant reduction in growth of oyster larvae at a concentration of only 0.025 p.p.m. The rate of growth of oyster larvae was almost the same in dipterex concentrations of 0.025 p.p.m., 0.05 p.p.m. and 1.0 p.p.m. i.e. it did not decrease appreciably with an increase in the concentration of dipterex. At 1.0 p.p.m., however, the mortality of oyster larvae reached almost 50 percent, whereas in the lower concentrations there was no appreciable mortality.

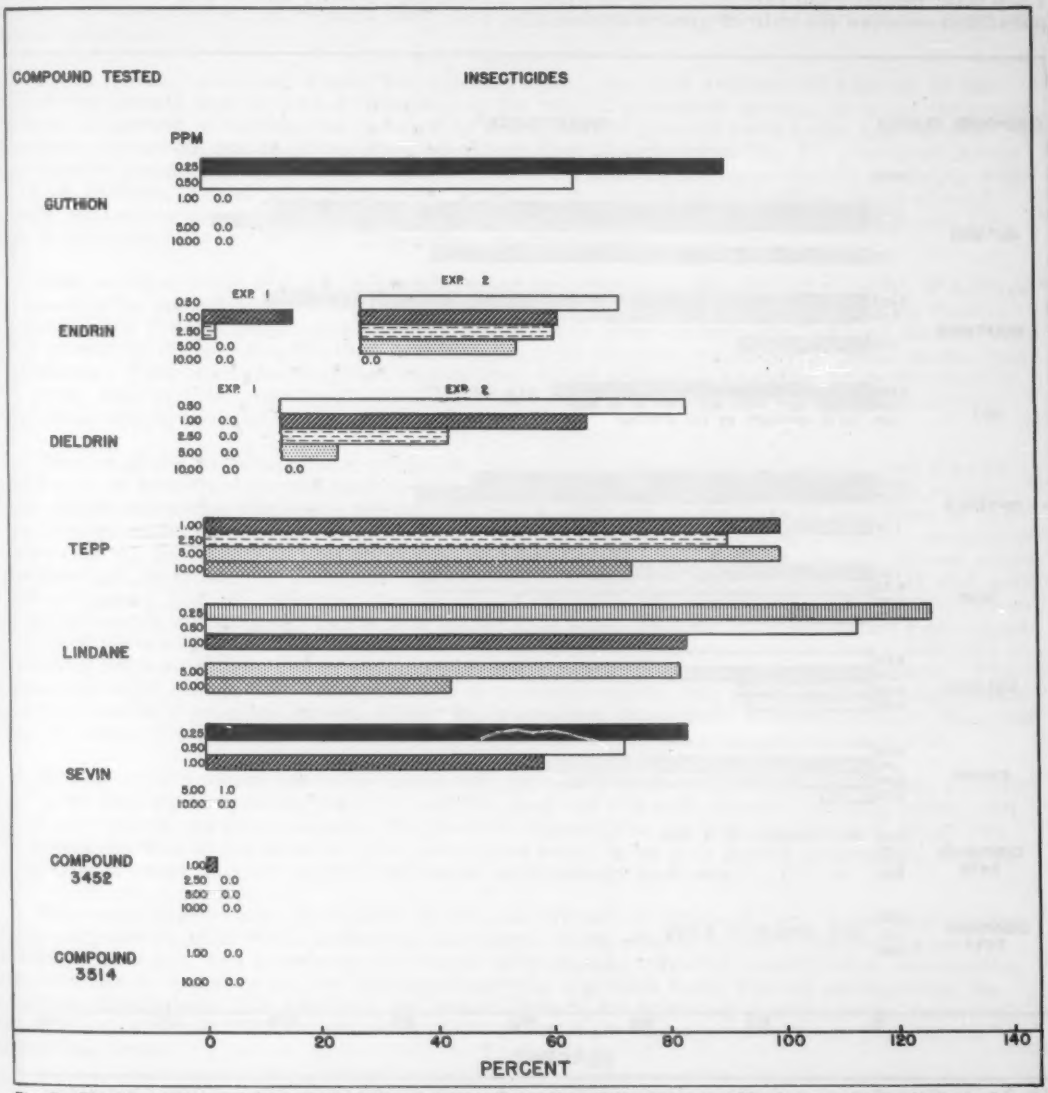

Fig. 7 - The effects of several concentrations of some insecticides on the relative percentage (R) of oyster eggs developing to the straight hinge stage. The percentages shown are averages of duplicate cultures at each concentration calculated as follows:

$$R = \frac{\text{average number of larvae in experimental cultures}}{\text{average number of larvae in control cultures}} \times 100$$

Guthion and parathion were two of the first insecticides to be tested for their effects on growth and survival of oyster larvae. Guthion has subsequently been tested for its effect on egg development. While guthion at 0.50 p.p.m. reduced the percentage of oyster eggs reaching the straight hinge stage and at 1.0 p.p.m. entirely prevented egg development (fig. 7), at very low concentrations (0.025 p.p.m. and 0.05 p.p.m.) it appeared to increase the rate of growth of oyster larvae (fig. 8). Parathion at 0.025 p.p.m. also slightly increased the rate of growth. Both compounds, however, are toxic at higher concentrations. Guthion at a concentration of 1.0 p.p.m. reduced the rate of growth of oyster larvae appreciably and at this concentration parathion reduced the rate of growth drastically.

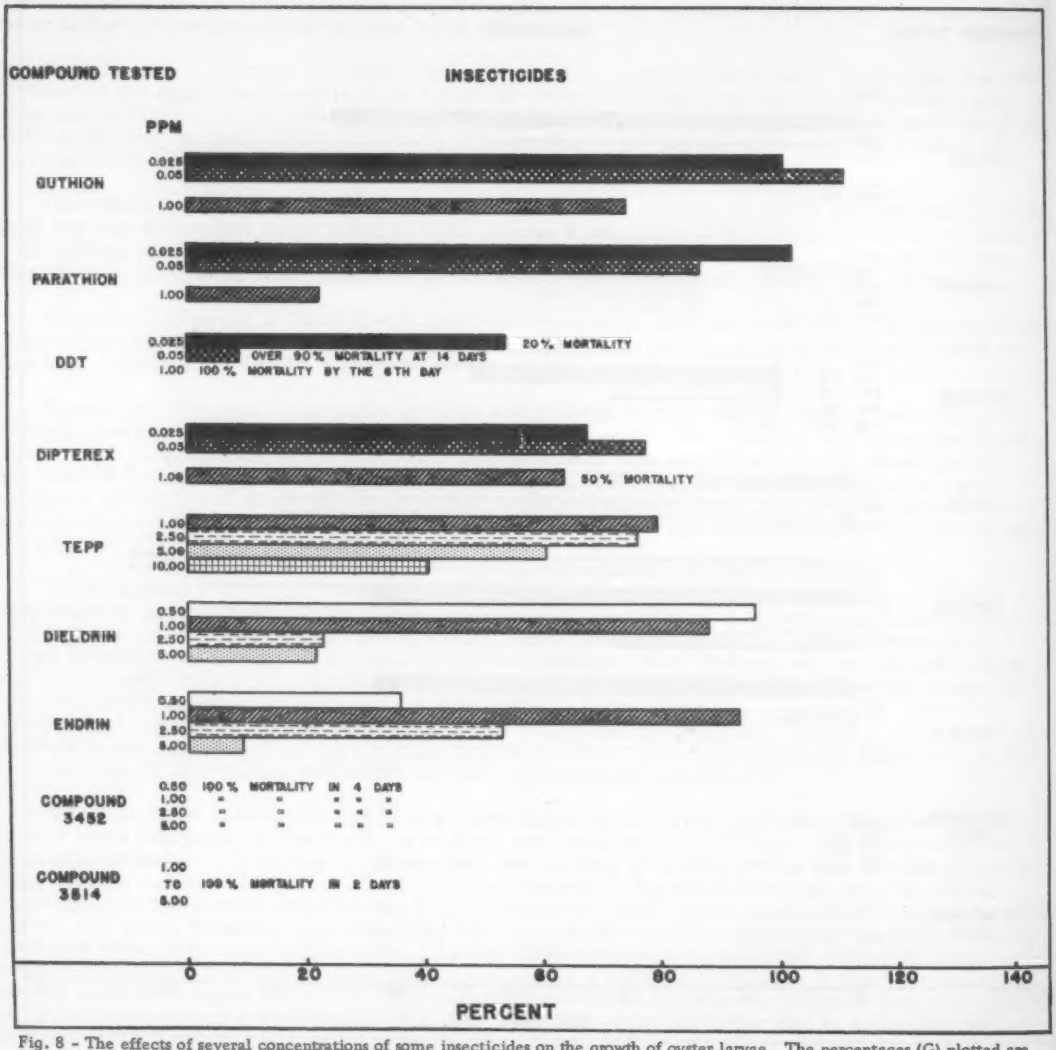

Fig. 8 - The effects of several concentrations of some insecticides on the growth of oyster larvae. The percentages (G) plotted are averages of duplicate cultures at each concentration calculated as follows:

$$G = \frac{\text{mean length of experimental larvae at 14 days - mean length at 48 hours}}{\text{mean length of control larvae at 14 days - mean length at 48 hours}} \times 100$$

DISCUSSION

In general, some eggs were capable of developing into normal straight hinge larvae in higher concentrations of almost all of the compounds tested than the larvae could tolerate and grow. Guthion was the only compound that permitted normal or near normal growth of larvae at concentrations which allowed less than 50 percent of the eggs to develop normally. Thus, at 1.0 p.p.m. of guthion only 31 percent of the clam eggs and no oyster eggs developed normally, yet clam larvae survived and grew almost as well as the controls. Oyster larvae showed no mortality and at 14 days their increase in length was about 75 percent as great as that of controls.

As previously reported (Davis and Chanley 1955), the first evidence of toxicity of dissolved compounds was usually a reduction in the rate of growth of larvae. In many instances the rate of growth of larvae was reduced by more than 50 percent before any appreciable mortality occurred, and in some, such as nabam (fig. 2) and aldrin (fig. 7), growth of larvae was almost completely stopped by concentrations too low to cause appreciable mortality within 12 or 14 days. Under such conditions, however, in natural waters larvae would almost surely die before reaching metamorphosis or the greatly extended larval period would result in enormous losses through dispersion, predation, etc.

With at least some of the compounds tested the effects on growth and survival of bivalve larvae may be an indirect effect resulting from the toxicity of the compounds to the food organisms used (Ukeles personal communication). With other compounds, such as sulmet, very good growth of larvae was obtained in concentrations that are inhibitory or lethal to the food organisms. This indicates that food organisms, killed without coagulation or destruction of the cells, may still be good food. Similarly, food cells killed by ultraviolet treatment are still utilizable by bivalve larvae.

Twelve of the 31 compounds, at one or more of the concentrations tested, gave a more rapid rate of growth of larvae than did the controls. This increased rate of growth ranged from slight increases that were not statistically significant, in the case of parathion on oysters (fig. 8), lindane on clams (fig. 6), and trichlorobenzene, diuron and, possibly, acetone on clams (fig. 4), to increases that appear to be highly significant, such as phenol, sulmet, chloramphenicol, dowicide "A" on clams (fig. 2), monuron and fenuron on clams (fig. 4), and guthion on oysters (fig. 8). The four that produced the most pronounced increases are known to be bacteristatic substances. Since it is known that some bacteria produce toxins that retard growth of larvae (Davis 1953, Walne 1958a, 1958b), it is presumed that the increased rate of growth of larvae in these cases is the result of inhibiting the growth of toxic bacteria. The remaining eight compounds are not known to be bacteristatic but, since it seems improbable that they actively promote growth of larvae, it appears likely that, in some manner, they also tend to reduce the number of bacteria that would otherwise slow the growth of larvae.

Decker (1960) states that "Any impartial appraisal of the impact of insecticides on wildlife must give equal consideration to both the good and bad side effects that may occur, and if we are honest, we must look for the good as diligently as we look for the bad" (page 30). He points out that at the present time pesticides seem to be only minor influents in nature compared to other factors in land and water development and use.

The great differences, in toxicity to bivalve larvae, of different compounds used for the same purpose suggest that a sufficient knowledge of the effects of these compounds on bivalves, their eggs, and larvae should enable us to choose effective insecticides, weedicides, etc., for use in marshes and on land draining over shellfish beds, without endangering the shellfish population. For example, the use of lindane for spraying marsh areas, instead of the much more toxic DDT, might do much to restrict the damage to shellfish populations within the area.

The concentration of pesticides in estuarine waters resulting from runoff from treated land areas, of course, cannot be predicted. It would be expected to be highest where the runoff enters the estuary, but actual concentrations would only be determined by chemical analy-

sis of the water. As a guide in direct addition of a pesticide to a body of water, as in the control of aquatic weeds and mosquito control programs, assuming that all of the pesticide goes into solution and is uniformly distributed, an application of one pound per acre would give a concentration of 0.37 p.p.m. in water one foot deep. If the water were 16 feet deep, the concentration would be 0.37 ÷ 16 or 0.023 p.p.m. In the case of DDT, this would still be enough to reduce the rate of growth of oyster larvae by 40 percent and to reduce their survival by 20 percent.

Loosanoff (1947) and Waugh and Ansel (1956) found that oyster shells treated with a kerosene solution of DDT caught almost as many oyster spat as did untreated shells and that the number of barnacles that set on such treated shells was greatly reduced. Waugh et al (1952), however, reported that lindane was almost as effective as DDT in treatment of shells to prevent setting of barnacles. Since the toxicity of lindane to bivalve larvae is much lower than that of DDT, lindane would seem to be the logical choice for such usage.

Loosanoff et al (1957) also found that crustaceans of the subclass Copepoda, in mass cultures of algae, could be killed by use of 1.0 p.p.m. of guthion, dipterex, parathion, lindane, or DDT. They found that lindane at 0.05 p.p.m. also killed these crustaceans, and have unpublished data showing an 80 percent mortality of adult green crabs in 0.2 p.p.m. Ukeles (unpublished data) has shown that the five species of algae tested tolerate up to 0.5 p.p.m. of lindane. Since clam larvae showed optimum growth at 5.0 p.p.m. lindane, it suggests the possibility that in enclosed bodies of water, as in pond culture, a sufficient concentration of this chemical could be maintained to destroy all crustacean larvae, probably including those of barnacles, without affecting the growth of bivalve larvae or their food organisms.

The fact that oysters will set on shells treated with a substance as toxic to larvae as DDT indicates that chemicals, with the very low solubilities characteristic of many of these pesticides, can be safely used in controlling fouling organisms and predators if properly applied. The chlorinated benzenes, which are the basic ingredient of the chemical methods proposed for predator control by Loosanoff et al (1960) are not only relatively insoluble but also relatively nontoxic to eggs and larvae of bivalves. Moreover, the method of application proposed by these authors is designed to limit their dispersal. It should be possible, by suitable choices of chemical additives, to develop mixtures that, when used on spat collectors or on shellfish beds, will control many of the competitors and predators of shellfish without affecting the development and growth of shellfish and their foods.

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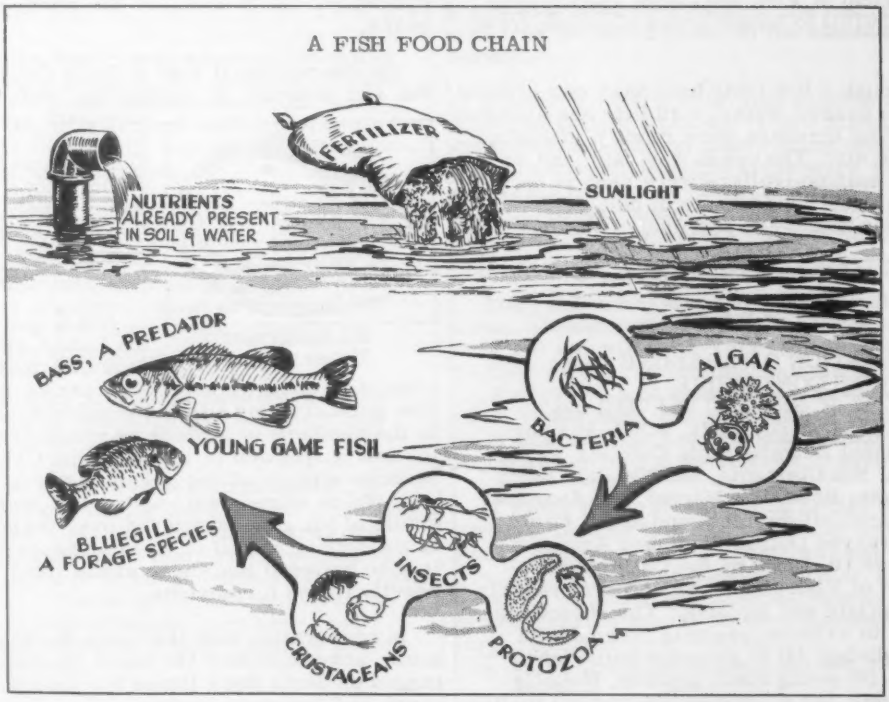

TRENDS AND DEVELOPMENTS

California

SHRIMP STUDY OFF CALIFORNIA COAST CONTINUED:

Airplane Spotting Flight 61-12-Shrimp: The coastline from San Francisco to the Oregon border was surveyed from the air on September 27, 1961, by the California Department of Fish and Game Twin Beechcraft N5614D to locate areas of shrimp trawling.

Although a low lying heat haze was present over the coastal water, visibility was good and the shrimp trawlers were readily identified from the air. The ocean was calm and numerous salmon trollers were seen in the offshore waters. No schools of pelagic fish were seen, nor were any whales or porpoises noted.

Note: Also see Commercial Fisheries Review, Aug. 1961 p. 18.

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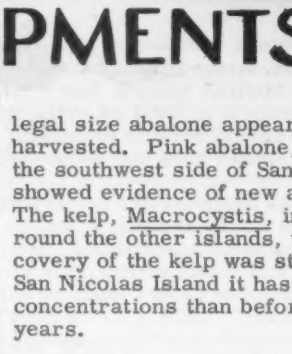
INVESTIGATION OF ABALONE RESOURCES CONTINUED:

M/V "N. B. Scofield" and "Mollusk" Cruises 61S4, 61S5, 61M1, 61M2-Abalone: The Channel Islands (Santa Catalina, Santa Barbara, San Clemente, San Nicolas, Santa Cruz, Santa Rosa, San Miguel, and Anacapa) and the area off the mainland at Pt. Loma were surveyed (August 7-20 and August 30-September 10, 1961) by the California Department of Fish and Game research vessels N. B. Scofield and Mollusk. The objectives were (1) to examine areas of commercial abalone diving; (2) to examine established stations; (3) to tag black abalone, Haliotis cracherodii, for growth and movement studies in cooperation with the Santa Barbara Museum; and (4) to collect and photograph species of abalone.

All of the Channel Islands were visited and areas where commercial diving had been conducted were examined. In general, most legal size abalone appeared to have been well harvested. Pink abalone, H. corrugata, on the southwest side of San Clemente Island showed evidence of new and rapid growth. The kelp, Macrocystis, in that area and around the other islands, was quite thick. Recovery of the kelp was still continuing and at San Nicolas Island it has returned in greater concentrations than before the warm-water years.

On the northeast side of Santa Cruz Island the red abalone, H. rufescens, was the dominant species in certain areas. During previous explorations in the same general areas the pink abalone, H. corrugata, was the dominant species.



Red Abalone Shell
(Haliotis rufescens)

Examination of the island stations revealed that considerable changes have been taking place. The most striking was the marked decrease in the numbers of abalone as compared with the last inspection in 1960. At the Catalina stations almost all the abalone have either died (there were great numbers of empty shells of all sizes scattered over the bottom of the station areas) or have disappeared. It is also believed that these areas have been heavily fished for abalone.

In cooperation with the Santa Barbara Museum, approximately 150 black abalone were tagged on Santa Rosa Island for growth, movement, and longevity studies.

Still and moving pictures were taken in black and white and in color of activities of the investigation and of the species of abalone taken.

Note: Also see Commercial Fisheries Review, March 1961 p. 22.

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PELAGIC FISH POPULATION SURVEY CONTINUED:

M/V "Alaska" Cruise 61A6-Pelagic Fish: The coastal waters of central Baja California, Mexico, from Ballenas Bay to Santa Rosalia Bay were surveyed (September 1-16, 1961) by the California Department of Fish and Game research vessel Alaska. The objectives were (1) to survey the sardine population to determine the amount of recruitment from this year's spawning and to measure the population density of older fish; (2) to sample Pacific mackerel, jack mackerel, and anchovies for age and distribution studies; and (3) to make incidental collections requested by other investigations.

Of the 56 night light stations occupied, sardines were present at 11, anchovies at 13, Pacific mackerel at 15, and jack mackerel at 4.

While the vessel was scouting 324 miles between light stations, 327 anchovy, 17 sardine and 3 Pacific mackerel schools were sighted. Many additional anchovy schools were observed during daylight hours while under way and on anchor.

Eight of the 11 samples of sardines appeared to be fish-of-the-year. All fish under 120 mm. were schooled with anchovies. Only one sardine sample of large adults (180-200 mm.) was collected. Most of this sample consisted of fish which were sexually developed for spawning.

All sardine schools sighted were in one small area of Sebastian Vizcaino Bay and appeared to be adults.

Anchovies were observed in unusually large numbers during the 1960 survey. They were distributed over the entire area surveyed, ranging from thin, widely scattered, surface schools to large dense school groups. The dominant size group of anchovies, 70-90 mm. standard length, may have been under-sampled due to their negative phototactic behavior.

Small numbers of Pacific and jack mackerel were taken at light stations, usually with other species.

A sample of white sea bass was collected at Asuncion Bay where they were unusually abundant. The capture of 2 sablefish (Anoplopoma fimbria) in a deep-water free-floating trap off San Benito Islands represents a possible southward range extension.

Sea surface temperatures ranged from 18.2° C. (64.8° F.) at Point San Eugenio to 24.0° C. (75.2° F.) at Ballenas Bay. Fair weather was prevalent during the entire cruise.

Airplane Spotting Flight 61-11-Pelagic Fish: The inshore area from the United States-Mexican Border to Point Reyes, Calif., was surveyed from the air (September 11-14, 1961) by the Department's Cessna "182" 9042T to determine the distribution and abundance of pelagic fish schools.

Except for 1 day in central California weather conditions were unfavorable. Low coastal clouds, fog, and generally poor visibility prevailed over most of the inshore area from Point Arguello to the Mexican Border.

In southern California, fish schools were observed in only 2 places--1 to 2 miles offshore at South Laguna where many small, fragmentary, unidentified spots were being harrassed by a large number of bonito, and near the Seal Beach Ammunition Depot breakwater where there were 8 medium-size anchovy schools.

Many anchovies were in Monterey Bay in a thin, almost continuous band between Capitola and the middle of Fort Ord, in very shallow water. No attempt was made to count the fish because of the lack of school integrity. There were similar anchovy concentrations in Halfmoon Bay and Bolinas Bay, with approximately 25 to 50 schools in each place.

A fairly large school group of fish was present between Gamboa Point and Lopez Point. Although identification was not positive, the 120 schools displayed color and behavior patterns typical of sardines. The schools varied in size from small spots to large, concentrated schools.

Note: Also see Commercial Fisheries Review, Nov. 1961 p. 15.

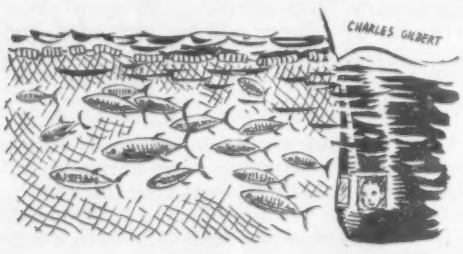
Central Pacific Fisheries Investigations

NEW RESEARCH VESSEL FOR HONOLULU BIOLOGICAL LABORATORY:

Reflecting the growing national interest in exploration of the oceans and development

of aquatic food resources, the U. S. Bureau of Commercial Fisheries received for fiscal year 1962 an appropriation of $1,763,400 for the design and construction of an oceanographic and fisheries research vessel for its Biological Laboratory at Honolulu. Design of the vessel and supervision of its construction will be the responsibility of a firm of naval architects and marine engineers of Seattle, Wash.

While preliminary planning of the new ship has just begun, the general specifications call for a large and versatile vessel with a 10,000-mile cruising range and accommodations for 10 scientists and 20 crewmen. The oceanographic installations will permit collection of water samples and water temperature measurements to any depth and the towing of a variety of plankton nets and midwater trawls for sampling the small marine animals. Tuna and other large fish will be collected for study by means of long lines, gill nets, and trolling gear. The shipboard laboratory will have aquaria for experiments in the hatching and rearing of fish and for holding live specimens for observa-



tion. Underwater glass viewing ports at bow and stern, which were first employed for the study of tuna behavior in the Laboratory's present vessel, the Charles H. Gilbert, will also be a feature of the new ship.

The varied specialized requirements of oceanographic and fishery research vessels are receiving intensive study in many parts of the world, according to the proceedings of the FAO-sponsored conference on research ship design at Tokyo held in 1961.

In the past the Biological Laboratory at Honolulu, like most similar institutions throughout the world, has had to rely to a large extent on adaptations of ordinary commercial fishing boats to meet its seagoing research needs. Of the three vessels with which the Laboratory's scientists have spread a tight network of observations over the expanses of the central Pacific, one was a conventional purse seiner and another was a standard California tuna clipper, neither particularly well suited to oceanographic work. The 118-foot Charles H. Gilbert, the only vessel operated by the Laboratory at present, was built in 1952 specifically for research, but its size imposes limitations on the area that can be covered and the types of observations and studies that can be carried on in the open sea. When the new vessel enters service, probably in 1963, greater scope for observation and collection and a wider range of facilities for study and experimentation will be afforded the Laboratory's scientists.

Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-AUGUST 1961:

Fresh and Frozen Fishery Products: For the use of the Armed Forces under the Department of Defense, 2.0 million pounds (value $1,082,000) of fresh and frozen fishery products were purchased in August 1961 by the Military Subsistence Supply Agency. This was lower than the quantity purchased in July by 6.2 percent and was 15.9 percent under the amount purchased in August 1960. The value of the purchases in August 1961 was higher by 7.0 percent as compared with July and 9.1 percent less than for August 1960.

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Supply Agency, August 1961 with Comparisons

QUANTITY				VALUE			
August		Jan.-Aug.		August		Jan.-Aug.	
1961	1960	1961	1960	1961	1960	1961	1960
(1,000 Lbs.)				($1,000)			
1,998	2,377	15,001	16,036	1,082	1,190	7,404	8,260

During the first 8 months of 1961 purchases totaled 15.0 million pounds (valued at $7.4 million)--a decrease of 6.5 percent in quantity and 10.4 percent in value as compared with the same period in 1960.

Prices paid for fresh and frozen fishery products by the Department of Defense in August 1961 averaged 54.2 cents a pound, about 6.8 cents more than the 47.4 cents paid in July and 4.1 cents above the 50.1 cents paid during August 1960.

Canned Fishery Products: Tuna was the principal canned fishery product purchased for the use of the Armed Forces during August this year. In the first 8 months of 1960, purchases of canned tuna were up 95.0 percent and canned sardines were up 16.2 percent as compared with the same period in 1960. Most canned salmon purchases are made at the end of the canning season--usually in September or October.

Table 2 - Canned Fishery Products Purchased by Military Subsistence Supply Agency, August 1961 with Comparisons

Product	QUANTITY				VALUE			
	August		Jan.-Aug.		August		Jan.-Aug.	
	1961	1960	1961	1960	1961	1960	1961	1960
	(1,000 Lbs.)				($1,000)			
Tuna	257	324	4,393	2,254	117	133	1,940	993
Salmon	-	1	2	4	-	1	2	3
Sardine	2	15	115	99	1	6	55	41

Note: Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are higher than indicated because local purchases are not obtainable.

* * * * *

VETERANS ADMINISTRATION AWARDS ON CANNED TUNA AND SALMON:

The following canned fish awards were announced by the Veterans Administration Supply Depot at Hines, Illinois:

Tuna, dietetic--9,940 doz. No. ½ cans at $2.95 per dozen. Awarded to Boston firm, 1½ percent-10 days, f.o.b. Eastport, Maine.

Tuna, light meat, chunk style, in vegetable oil--6,180 doz. 4-lb. cans at $21.15 per dozen. Awarded to San Diego, Calif., canning firm, 1½ percent-20 days, f.o.b. San Diego, Calif.

Salmon, dietetic--10,060 doz. No. ½ cans at $4,995 per doz. and salmon, red or sockeye--21,320 doz. No. 1 cans at $7.8475 per doz., awarded to a Seattle, Wash., firm, 1½ percent-10 days, f.o.b. Seattle, Wash.

Salmon, med. red or coho, with skin and backbone on--2,750 doz. 4-lb. cans at $30.98 per dozen, awarded to another Seattle, Wash., firm, 1 percent-10 days, f.o.b. Seattle, Wash.

Fisheries Loan Fund

LOANS APPROVED, JULY 1-OCTOBER 31, 1961:

From the beginning of the program in 1956 through October 31, 1961, a total of 1,026 applications for $30,363,304 have been received. Of these 536 ($13,267,774) have been approved, 354 ($9,407,216) have been declined or found ineligible, 100 ($5,442,079) have been withdrawn by applicants before being processed, and 36 ($759,330) are pending. Of the applications approved, 208 ($1,486,905) were approved for amounts less than applied for.

The following loans were approved from July 1, 1961, through October 31, 1961:

New England Area: Joseph J. Krawiec, Stonington, Conn., $18,000; Peter Condelli, Medford, Mass., $40,000; Gerald C. McCarthy, South Dartmouth, Mass., $38,000; Leroy A. Cushman, Port Clyde, Maine, $2,500; and George P. Berry, Port Norris, N. J., $4,500.

South Atlantic and Gulf Area: George E. Lipscomb, Magnolia Springs, Ala., $19,000; Waasy T. Franks, Fort Myers, Fla., $13,250; A. I. and C. P. Tormala, Fort Myers, Fla., $15,000; Edgar J. Kirby Construction Corporation, Fort Pierce, Fla., $3,500; E. J. Kirby and Walter Rosslow, Fort Pierce, Fla., $9,000; Clarence W. Hammond, West Palm Beach, Fla., $59,000; Henry and Elizabeth von der Hofen, Galveston, Tex., $16,250; A. B. Allen and James F. White, Brownsville, Tex., $15,350; and Tatum Bros., Brownsville, Tex., $37,200.

California Area: Richard O. Young, Eureka, $28,260; Edward X. Madruga, San Diego, $350,000; Ernest R. Monteiro, San Diego, $113,000; Frank and Cecelia Souza, San Diego, $5,770; and Arnold A. Vidal, San Diego, $120,000.

Great Lakes Area: Melvin M. Erickson, Bayfield, Wis., $2,000.

Hawaii Area: Hajime Yamane, Aiea, $7,540.

Pacific Northwest Area: Glen L. and Kenneth L. Martinson, Oceanlake, Ore., $6,680; and Archie F. Larson, Port Angeles, Wash., $25,000.

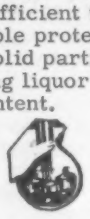
Alaska: Patrick D. Robinson, Juneau, $4,975.

Note: See Commercial Fisheries Review, Sept. 1961 p. 23.

Fish Solubles

PATENT ON RECOVERY OF FISH SOLUBLES:

United States Patent No. 2,934,433, dated April 26, 1960, provides for a process for the recovery of fish solubles. A mixture of fish stickwater containing particles of insoluble proteins and dissolved proteins and comminuted raw fish viscera are heated to 170° to 200° F. (76.7° to 93.3° C.) at pH 4 to 8.5 for a time sufficient to peptize and disperse the insoluble proteins. After cooling, the nonprotein solid particles are separated and the remaining liquor is evaporated to a higher solids content.



Florida

FISHERIES RESEARCH, APRIL-JUNE 1961:

Research with funds provided by various sources, including the Florida State Board of Conservation and the U. S. Fish and Wildlife Service is being carried on by the Marine Laboratory of the University of Miami. The research of interest to commercial fisheries which appeared in the Laboratory's June 1961 Salt Water Fisheries Newsletter follows:

Larval Shrimp: Investigation of the seasonal and geographical distribution of the young of the pink shrimp (Penaeus duorarum), the commercial species caught off Key West, has been continued through a contract with the U. S. Fish & Wildlife Service. Collections were made during practically every month and over as wide a geographical area as possible on the Tortugas fishing grounds to give a complete picture of the distribution of pink shrimp larvae there. Specimens were collected from Sanibel Island to south of the Florida Keys, and from the 100-fathom line inshore to 2 fathoms.

Samples obtained during this year revealed centers of abundance of larvae, which are believed to represent a peak of spawning activity on the Tortugas fishing grounds. During the summer peak of spawning, the center of abundance was near the area of maximum fishing effort. In the period November 1960-February 1961, there were fewer larvae at the center of the grounds than in deeper water to the northwest. This suggests that the center of spawning shifted to deeper water. In March and April 1961, the numbers of larvae were greater than in the winter months, and the center of abundance was again in shallower water of from 13-17 fathoms.

Spotted Sea Trout: Specially-designed tagging experiments were carried out on spotted sea trout (Cynoscion nebulosus) in the vicinity of Pine Island, near Fort Myers, during January 1961. The results of the tagging experiments are being analyzed. The preliminary results suggests that mortality due to natural causes, predators, disease, etc. is about five times as high as mortality due to fishing. This result, which will be checked with more information, is not surprising, but it is contrary to the belief held by most fishermen, i.e., that the other fishermen are taking the majority of the fish.

Nonutilized Species Incidental to Shrimp Fishing: The investigations conducted during the past year of utilizing trash fish produced some interesting results.

Economic and mechanical difficulties have discouraged the collection of trash fish from shrimp trawlers in the past, consequently vast quantities of fish have been discarded. The method investigated facilitates the landing and marketing of scrap fish by making possible the storage of fish without refrigeration for extended periods of time.

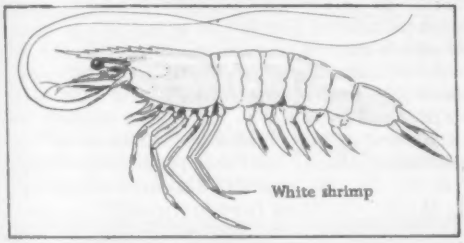
The process consists of an enzymatic hydrolysis or auto-digestion. The fish is digested by its own gastric juices. To prevent bacterial spoilage and the formation of offensive odors, a quantity of acid is added, which also aids the action of the enzymes of the fish.

In the process of hydrolysis the fish becomes liquified, with the formation of two factions: a clear liquid and a semisolid sediment. The liquid contains soluble proteins and fragments of these nutrients; the solids contain undigested fish and minerals.

The "liquid fish" can be used as a starting material for the preparation of fish solubles, fish meal, concentrated pet food, fish hatchery food, or other animal feeds.

If the liquid fish which contains crude protein, can be further hydrolysed and the products refined it can provide food for humans.

Fish Behavior Studies: Experiments on the effects of light upon the pink shrimp (Penaeus duorarum) and the white shrimp (P. setiferus), a project sponsored by the National Science Foundation, are in progress. Preliminary results indicate that under controlled conditions in the laboratory some intensities and wave lengths of light may be more attractive to pink shrimp than food odors. After the shrimp were starved for varying periods, their willingness to cross an electric barrier to obtain food was measured. It was found that a higher voltage was required to prevent them from approaching certain beams of light than to prevent them from approaching the food. These findings have a definite application to shrimp fishing.


White shrimp

A scientist visiting from Japan on a grant from the National Science Foundation has been doing work on the vision of pelagic fish. He has found that certain pelagic fish, for example, the blackfin tuna, do not see clearly things that appear directly ahead of them. The blackfin does focus clearly, however, on objects that are slightly above it. This observation is in keeping with what we know of the swimming and feeding habits of the animal which normally swims at some distance under the surface and feeds on fishes swimming at or near the surface.

Experiments on detection of low-frequency sound by sharks are also in progress. Preliminary results indicate that nurse shark (Ginglymostoma cirratum) and lemon shark (Negaprion brevirostris) are well adapted to experimental procedures and that they learn rapidly in a test situation. This project is sponsored by the office of Naval Research.

Note: See Commercial Fisheries Review, August 1961 p. 25.

Fur Seals

PRICES FOR ALASKA SKINS DROP AT FALL AUCTION:

The autumn 1961 auction sale of the U. S. Government and other foreign-produced fur seal skins was held at St. Louis, Mo., on October 5 and 6, 1961. At this sale, a total of 27,239 seal skins were sold for the account of the U. S. Government at a total value of $2,187,696.

The average price for United States conventionally-processed Alaska seal skins was $86.69 per skin, a decline of 3.8 percent from the spring sale. Average prices received for the various types of skins were; Matara, $81.29 (down 2.6 percent); Black, $91.73 (down 2.0 percent); Kitovi, $84.56 each (down 11.1 percent). The price decline reflects the general decrease in the prices of other high-quality furs.

An encouraging aspect of the sale was the very substantial increase in the price of the sheared female or Lakoda skins. Lakoda skins were first offered for sale in the fall of 1960 when the skins averaged $36.05 each. In the spring of 1961, the price dropped to $11.99. However, at the autumn sale the average price jumped to $41.05 per skin for the 3,805 skins offered for sale, an increase of 242 percent.

Note: See Commercial Fisheries Review, July 1961 p. 18.

Great Lakes Fishery Investigations

LAKE ERIE FISH POPULATION SURVEY CONTINUED:

M/V "Musky II" September 1961: The fish population survey in Lake Erie was continued by the U. S. Bureau of Commercial Fisheries research vessel Musky II. During early September, bottom trawls were towed at 8 stations in the Sandusky, East Harbor, and Island areas. The catches, particularly of yearling and older fish, were lighter than expected. An average of 553 fish was taken per 10-minute tow, of which 75 percent were young-of-the-year (mostly white bass, yellow perch, alewives, gizzard shad, and spot-tail shiners; sheepshead and channel catfish were caught in fair numbers at the Sandusky Bay station, and a total of 9 yellow pike or walleyes, averaging 7.0 inches in length, was taken at 3

stations). Surface water temperatures at the western end of the lake averaged 76° F.

Operations of the Musky II for the remainder of the month were highlighted by a 2-week fishery-limnological cruise to central and eastern Lake Erie and western Lake Ontario. Bottom samples were collected and complete water analyses were made at 9 stations established in Lake Erie by the Cisco in 1957; bathythermograph casts and Secchi-disc readings were made and surface water samples were taken at 7 other localities in the central basin. An overnight gill-net set (300 feet each of 2-, 2½-, and 3-inch mesh) northeast of Long Point at 25 fathoms caught 175 smelt, 3 yellow perch, and 1 cisco.

During a 3-day period in western Lake Ontario, near the mouth of the Niagara River, light-meter readings, bathythermograph casts, and oxygen analyses were made at 2 stations and surface water samples were collected at 18 others. Two-day gill-net sets (300 feet each of 2-, 2½-, and 3-inch mesh) at depths of 25 and 50 fathoms took 90 smelt, 9 alewives, and 8 coregonids or chubs of 4 species (Leucichthys artedii, C. kiyi, C. hoyi, and C. reighardi). Trawling was attempted at several locations with little success. Much of the area was unsuitable for bottom tows and appeared to be rather barren. Species taken (average, 107 fish per tow) were smelt, alewives, and spot-tail shiners (mostly young-of-the-year).

En route to Sandusky on the return trip, trawls were towed at stations previously established in Lake Erie, off Dunkirk, N. Y.; Erie, Pa., and Ashtabula, Fairport, and Cleveland, Ohio. A progressive increase in the catch of fish was apparent as the vessel progressed westward. Smelt, white bass, and yellow perch were taken in varying numbers. Water temperature averaged about 66° F., somewhat cooler than in the western end of the lake.

Note: Also see Commercial Fisheries Review, Nov. 1961 p. 19.

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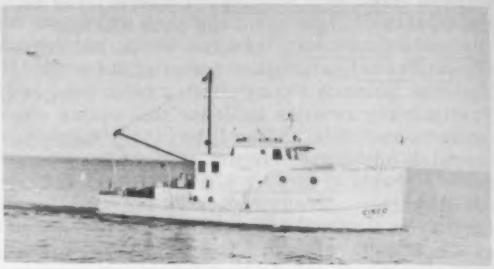
LAKE MICHIGAN FISH POPULATION SURVEY CONTINUED:

M/V "Cisco" Cruise 7: The chub (Leucichthys sp.) population survey in Lake Michigan was continued (September 19-October 3, 1961) by the U. S. Bureau of Commercial Fisheries research vessel Cisco.



Research vessel of the Service's Great Lakes Fisheries Investigations.

Most of the cruise was spent in fishing trawls and nylon gill nets of standard design, in order to add to the information on present chub populations needed to establish a base with which future populations may be compared. Standard gangs of gill nets (50 feet each of 1¼- and 1½-inch mesh, and 300 feet each of 2-, 2⅜-, 2¾-, 3-, 3½-, and 4-inch mesh) were set at 25 and 50 fathoms off Manistique, Mich., and Sturgeon Bay, Wis., and at 25, 50, 80, and 135 fathoms off Frankfort, Mich. Catches (predominately coregonids or chubs, Leucichthys sp.) were light in the 80- and 135-fathom sets and moderate in the others.

Six 30-minute bottom tows were made with a 50-foot balloon trawl at 15, 25, 35, and 30 fathoms off Arcadia, Mich. (10 miles south of Frankfort), and at 30 and 50 fathoms off Sturgeon Bay.

The extremely small catches at 35 and 50 fathoms off Arcadia were probably due, at least in part, to a strong current running opposite to the direction of tow, which caused the boat to move appreciably slower than usual at the normal engine speed (strong currents were also noted off Sturgeon Bay). A bathythermograph cast at 35 fathoms indicated that there was an upwelling in the area. The small chub catch at 15 fathoms was to be expected, since water was warm all the way to the bottom at this depth. Some alewives were taken in every tow; the maximum amount caught was 126 pounds, at 15 fathoms off Arcadia. Deep-water sculpins (up to 8 pounds), a few slimy sculpins and smelt, and a single longnose sucker were the only other species caught in the trawls.

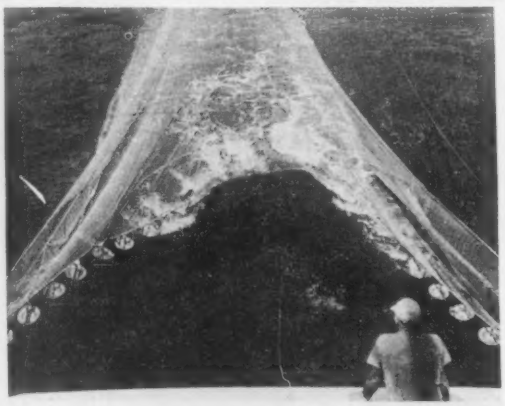
Regular hydrographic stations were visited at 40 fathoms off Frankfort, Charlevoix, and

Sturgeon Bay, and at 142 fathoms in midlake between Frankfort and Sturgeon Bay. The surface water, which was cooling during the cruise, ranged from 10.0° to 19.0° C. (50.0° to 66.2° F.). The epilimnion was deepening under the influence of almost constant strong winds, and in places there was complete mixing down to a depth of nearly 25 fathoms.
Note: Also see Commercial Fisheries Review, Nov. 1961 p. 20.

Gulf Exploratory Fishery Program

EXPERIMENTAL MIDWATER TRAWL TESTED AND COMPARED WITH BRITISH COLUMBIA TYPE:

M/V "Oregon" Cruise 74 (March-April 1961): The evaluation of the gross mechanical performance of a "standard" British Columbia midwater trawl and an experimental-design midwater trawl was the purpose of this cruise of the M/V Oregon, exploratory fishing vessel of the U. S. Bureau of Commercial Fisheries.



Setting mid-water trawl showing head rope transducers and camera mount.

The standard trawl (82-foot headrope, 56-foot maximum designed opening) fished on 6- x 3-foot doors was found to spread from 24 to 54 feet vertically and from 12½ to 25½ feet horizontally, depending upon vessel speed. A direct relationship between horizontal spread and increased speed was found in all tests as was an inverse relationship between the vertical spread and increased speed.

A departure from normal trawl construction involving fitting the trawl longitudinally to riblines of precalculated length (in this case 86.6 percent of the stretched mesh measure, since the headrope, footrope, and breastlines were hung in 50 percent of stretched mesh width) was also tested. These tests did not indicate any increase of spread or towing speed over the same net without riblines. Tests of the experimental trawl were not completed due to early termination of the cruise.

Preliminary field tests were conducted with a newly-designed remote control 16 mm. movie camera system designed to obtain a photographic record of gear performance under conditions not suitable for diver observations and to study fish-escapement behavior with respect to the gear. Also, initial experiments were made with a headrope-mounted sonic transducer.

The movie camera (400-foot film capacity) performed as designed. Remote control of the drive motor permits operation of the unit when desired, for example, when fish are observed via the headrope-mounted sonic transducer. Approximately 200 feet of intelligible film taken at a depth of 23 fathoms was obtained on this initial trial.

* * * * *

EXPLORATORY SHRIMP FISHING IN SELECTED AREAS OF NORTH-CENTRAL GULF OF MEXICO:

M/V "Oregon" Cruise 76A (October 2-8, 1961): To test-fish for shrimp in selected areas in the 25-70 fathom depth range in selected areas of the north-central Gulf of Mexico where exploratory trawling in previous years revealed small, unfished concentrations of brown shrimp (Penaeus aztecus) was the objective of this cruise of the M/V Oregon. This exploratory fishing vessel of the U. S. Bureau of Commercial Fisheries made a total of 27 nighttime tows with 40-, 60-, and 70-foot shrimp trawls in the following areas: I-40 to 72 fathoms southeast of Pensacola, Fla.; II-20 to 56 fathoms south of Gulf Shore, Ala.; III-30 to 52 fathoms east of North Pass (Delta); IV-20 to 48 fathoms south of Southwest Pass (Delta).

Shrimp catches were very poor in all areas. Highest catch rates were obtained in area III in 33 fathoms. There a 70-foot trawl

produced 15 pounds (heads off) of brown shrimp per hour-tow. The few shrimp encountered beyond the 30-fathom curve averaged 12-15 count (heads off).

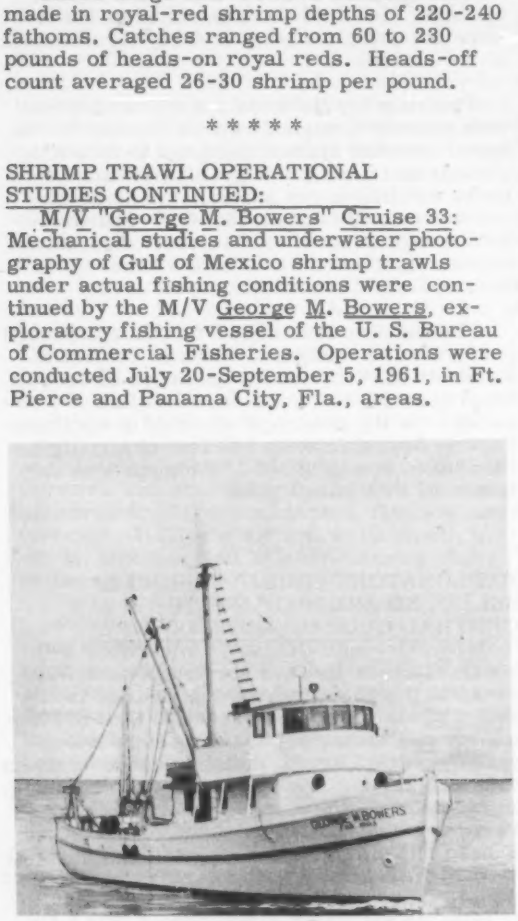
Six trawl tear-ups resulted from mud bogging in the Delta area.

Three drags of 2-3 hours duration were made in royal-red shrimp depths of 220-240 fathoms. Catches ranged from 60 to 230 pounds of heads-on royal reds. Heads-off count averaged 26-30 shrimp per pound.

* * * * *

SHRIMP TRAWL OPERATIONAL STUDIES CONTINUED:

M/V "George M. Bowers" Cruise 33: Mechanical studies and underwater photography of Gulf of Mexico shrimp trawls under actual fishing conditions were continued by the M/V George M. Bowers, exploratory fishing vessel of the U. S. Bureau of Commercial Fisheries. Operations were conducted July 20-September 5, 1961, in Ft. Pierce and Panama City, Fla., areas.



The Service's exploratory fishing vessel George M. Bowers.

Trawls photographed were the 40-foot flat, the 40-foot semiballoon, and the 40-foot balloon. One-half scale models of the three 40-foot designs were also photographed. A total of 4,500 feet of underwater film was obtained.

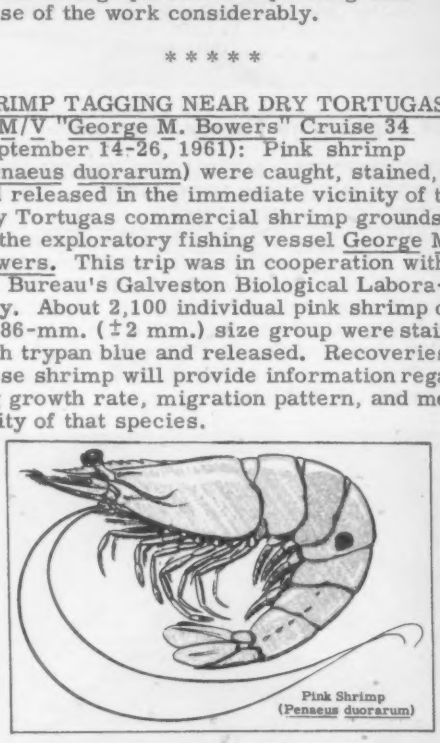
Preliminary field tests of a remote-reading strain gauge system were conducted. Modifications to the sensing elements and readout circuitry were found to be necessary.

A two-way sea sled-to-towing vessel voice communication system was used during all diving operations expediting this phase of the work considerably.

* * * * *

SHRIMP TAGGING NEAR DRY TORTUGAS:

M/V "George M. Bowers" Cruise 34 (September 14-26, 1961): Pink shrimp (Penaeus duorarum) were caught, stained, and released in the immediate vicinity of the Dry Tortugas commercial shrimp grounds by the exploratory fishing vessel George M. Bowers. This trip was in cooperation with the Bureau's Galveston Biological Laboratory. About 2,100 individual pink shrimp of an 86-mm. (±2 mm.) size group were stained with trypan blue and released. Recoveries of these shrimp will provide information regarding growth rate, migration pattern, and mortality of that species.



Pink Shrimp
(Penaeus duorarum)

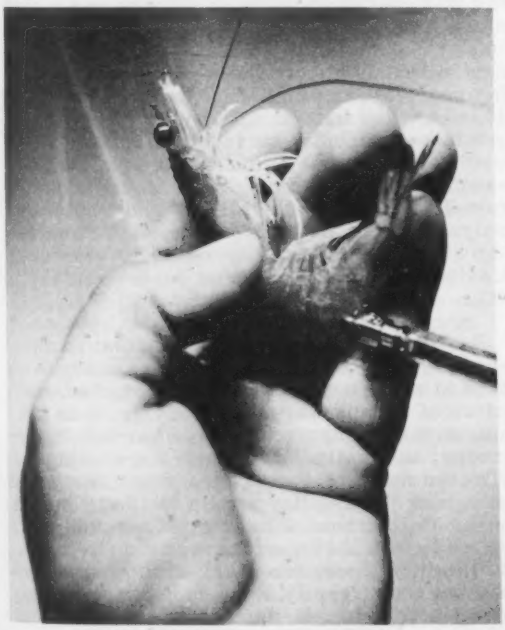
Originally it was intended also to stain 10,000 shrimp of all sizes with fast green FCF. It was necessary to forego this objective due to the high rate of mortality (75-80 percent) encountered in the holding tanks. Presumably this was the result of the high surface water temperatures during this summer.

Gulf Fishery Investigations

Some of the highlights of studies conducted by the Galveston Biological Laboratory of the U. S. Bureau of Commercial Fisheries during July-September 1961:

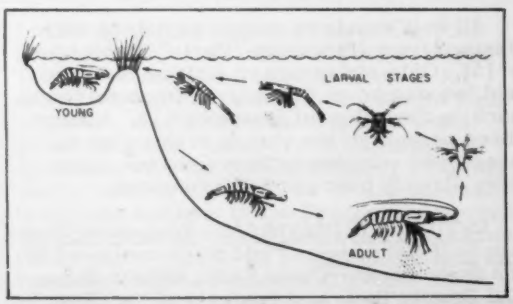
SHRIMP FISHERY PROGRAM: Migrations of Pink Shrimp: The final tally disclosed that commercial fishermen turned in 60 and 154 recaptures, respectively, of shrimp stained and released as juveniles at Bottle Key (13,309) in November and Lower Pine Island Sound (32,913) in December 1960. Of the Bottle Key recaptures, 10 came from Florida Bay within 6 miles of the release site and 50 from the Tortugas grounds about 120 miles to the west. Early Pine Island Sound recaptures were all made in the large Sanibel shrimping area west and northwest of Naples. Later ones came from a small section of the Sanibel grounds due west of Redfish Pass. Shrimp in both experiments were still being recaptured 6 months after release. The 50 recoveries from Bottle Key on the Tortugas grounds establish the affiliation between nursery areas in extreme northeast Florida Bay and the Tortugas shrimp stocks.

Mortality and Growth of Pink Shrimp: A dual-purpose study to determine (1) fishing mortality in the fished portion of a pink shrimp population and (2) growth in pink shrimp making the transition from pre-commercial to commercial size, began near the end of the quarter. The study's first phase, execution of two simultaneous mark-recapture experiments, was initiated during the week of September 17, 1961, on the lower edge of the Tortugas fishing grounds. Use of the Bureau's M/V George M. Bowers facilitated this operation. Original plans called for the release of approximately 10,000 shrimp representing all commercial sizes and marked with fast green dye and 1,000 to 2,000 precommercial but uniformly-sized shrimp marked with Trypan blue. Because high water-surface and air temperatures resulted in the larger shrimp suffering excessive mortality during marking operations and prerelease holding periods, the first (or mortality) experiment had to be postponed to a period of more favorable conditions. The second experiment got under way, however, with 2,100 shrimp (84.0 to 87.9 mm. total length) being marked with Trypan blue and released at scattered points on the grounds. As of October 6, 126 had already been recaptured. The underwater shrimp release box designed for this study functioned as expected, and underwater still and motion pictures were made of it in action.



Injecting dye into a shrimp for marking to determine migrations and abundance.

Shrimp Spawning Populations: During the quarter the chartered trawler Belle of Texas made four cruises in the survey area between Freeport and Cameron. Of about 10,000 shrimp caught during those cruises, 36 percent were brown shrimp and 42 percent were rock shrimp, Sicyonia brevirostris. Ovary samples from each of 1,050 females (seven species) were fixed, sectioned, stained, and mounted. Study of these ovary sections is proceeding and will reveal the seasonal reproductive status of the various populations.



Life cycle of shrimp. Spawned in the ocean, the larvae (here greatly magnified) migrate to inshore nursery areas. As the shrimp grow, they return to sea where they support the most valuable of our commercial fisheries.

A cursory check of brown shrimp modal lengths tabulated according to cruise period, sex, and sample depth reveals that: (1) there is distinct sexual dimorphism, (2) size and depth of capture are directly proportional, and (3) recruitment to the offshore stocks begins in June.

This project acquired new dimensions recently when the survey area was expanded to include all waters west of the Mississippi River. Station transects have been positioned within each Bureau of Commercial Fisheries statistical area in order that information obtained with research vessels can be correlated with commercial landing data. Biological data consist of abundance estimates, species composition, length measurements, plankton collections, and ovary samples. Temperature, salinity, and current direction and velocity profiles are determined concurrently. Additional current studies utilizing drift bottles and bottom drifters are anticipated.

Implementing the expanded portion of this project in early September, the M/V Oregon trawled at 40 stations in depths of 30-60 fathoms between the Mississippi Delta and Galveston, and the M/V Belle of Texas at 21 stations between Galveston and Brownsville.

Bait Shrimp Fishery: Bait shrimp production in the Galveston Bay area during July and August dropped measurably below that for the same period in 1960. On the other hand, bait fishing effort showed a corresponding increase, all of which reflects a reduced survival to postlarval and juvenile stages this year. Comparatively poor production in offshore waters has also been a consequence.

All bait stands or camps sustained some damage from Hurricane "Carla" (September 9-13). Only six camps on Galveston Island and two camps on the Bolivar Peninsula were back in operation on September 18. Ninety-three percent of the camps in this general area were completely destroyed but many have already been partially restored.

ESTUARINE PROGRAM: Ecology of Western Gulf Estuaries: Field work continued in the three areas--Clear Lake, Offat's Bayou, and Trinity Bay--and analysis of the Clear Lake data for 1959, 1960, and through June of 1961 has been accelerated.

Plans for expansion of the project in the Galveston Bay system were made. These plans involve remodeling the 40-foot vessel Tommy Box which was obtained on surplus from the Border Patrol in Brownsville, Texas. Remodeling will include the installation of a new Diesel motor and changes to the afterdeck and cabin to accommodate instruments and trawling gear. Sampling stations are planned for both upper and lower Galveston Bay as well as East and West Bays. "Deep-water," bay stations; shore stations; and shallow, lake or bayou stations are to be set up.

Effects of Engineering Projects: A total of 56 appraisals were made of engineering projects affecting marine fishery resources. Of this number, only three did not involve Texas waters. The majority resulted from the more than 80 Corps of Engineers public notices screened during the quarter to determine which projects could materially affect marine and estuarine fishery resources. Marine fishery sections of 13 Bureau of Sport Fisheries and Wildlife draft reports on water development projects were reviewed for concurrence or recommendations.

Weekly sampling at 12 stations in Trinity Bay was continued, when conditions permitted, in connection with a study of the effects on Trinity Bay fauna of the Wallisville and Livingston Dam Projects (U. S. Army Corps of Engineers). Sampling at each station includes top and bottom salinity and temperature measurements, surface Secchi disc readings to provide a turbidity index, and a trawl haul for biological specimens. Data from 22 September samples are now being analyzed. This analysis will be of particular interest due to the passage of Hurricane "Carla" through this area on September 9-12, 1961.

Ecology of Eastern Gulf Estuaries: An ecological study of Tampa Bay was inaugurated to study the productive potential of the waters of Tampa Bay as nursery grounds for commercially important species of fish, crustaceans, and mollusks. Samples are being collected weekly from 29 locations distributed throughout Tampa Bay and up to 10 miles offshore. Collections of biological specimens are made with a 15-foot trawl, beach seine, and 1-meter plankton net. Hydrological data obtained concurrently consist of temperature, light penetration, pH, and salinity. Total phosphate-phosphorus and total organic and inorganic nitrogen will be taken at a few stations.

Already 25 families and 38 species of fish have been identified. Most numerous were Anchoa mitchilli, Galeichthys felis, Eucinostomus gula, Orthopristis chrysopterus, Bairdiella chrysura, Leiostomus xanthurus, and Lagodon rhomboides. The first observations indicate presence of high numbers (62-101) of fish in the trawls from the grass bottom areas off Egmont Key, in Terra Ceia Bay, and in Old Tampa Bay. Trawls over muddy bottom in the upper Hillsborough Bay produced relatively high numbers (84) of Galeichthys felis while trawls over sandy bottom were generally poor in fish.

Squids were abundant. Shrimps were the most abundant crustacea. Crabs, pelecypods, and echinoderms were also taken in smaller numbers.

INDUSTRIAL FISHERY PROGRAM: During the quarter an average of nine species comprised landings coming from west of the Mississippi River Delta (West Gulf), specifically in depths of $3\frac{1}{2}$ to 11 fathoms off Wine Island, Timbalier Island, Grand Isle, and West Bay (all in Louisiana). The average catch per tow for this area was 6,153 pounds. East of the Mississippi River Delta (East Gulf) an average of 16 species was present in catches made in 3 to 11 fathoms off Horn Island, Miss.; Petit Island, Miss.; Dauphin Island, Ala.; and Gulf Shores, Ala. The average catch per tow in the East Gulf was 3,702 pounds.

Atlantic croaker continued to be the dominant species in both fishing areas. Atlantic cutlassfish accounted for a significantly greater percentage of over-all landings. A twofold increase for this species was noted in East Gulf catches. Atlantic croaker also increased on both fishing grounds but was apparently more abundant in the East Gulf area. The spot was the only major species which showed a decline in either area.

The two species of sea trout commonly present in industrial catches were not separated until August. Cynoscion nothus, or silver sea trout, nearly always has 27 vertebrae, rarely 26; soft anal rays are predominantly 9; the eye is conspicuously larger in comparison with other sea trout; and the tongue is pigmented over most of its surface. In contrast, Cynoscion arenarius, or sand sea trout, has 25 vertebrae; 10 to 12 soft anal rays; and the tongue is pigmented only at the periphery.

Both species occurred in catches from the East Gulf at depths of 3 to 11 fathoms. In the West Gulf both species were taken from depths of 4 to 6 fathoms. Sand sea trout were six times more abundant in the East Gulf and 1.5 times more abundant in the West Gulf. On East Gulf grounds silver sea trout appeared most abundant in water 8 to 11 fathoms deep.

Silver sea trout evidently do not attain the size of sand sea trout on either the East or West Gulf grounds. The largest silver sea trout and sand sea trout measured 252 and 403 mm. (total length), respectively. In late August fish of both species with translucent ova were found in 9 fathoms at the entrance to Mobile Ship Channel. At the same time, fish of both species containing opaque ova were taken in 4 to 5 fathoms off Wine Island, La.

Examination of scales from silver and sand sea trout disclosed the presence of rings whose structure and distribution suggest them to be annuli. If this be the case, then 3-year classes appear to be present in the silver sea trout, while 4- and possibly 6-year classes represent the sand sea trout. The first- and second-year classes would be interpreted as dominating catches of both species.

Additional sea trout samples are being obtained from offshore stations by the Bureau's M/V Oregon. Life history samples of Atlantic croaker and spot are also being taken from industrial catches. Scales of these species are being examined for legibility and possible use in determining year class composition.

During the quarter 214 five-pound fish samples taken with trawls off the coasts of Texas and Louisiana were processed for species composition, length and weight measurements, and determinations of sex and gonad condition. All were obtained in cooperation with the Shrimp Fishery Program which recently extended its cruise schedule to include stations in the Freeport to Brownsville and Cameron to Mississippi River areas. One 5-pound sample is being randomly drawn from the unsorted catches of 1-hour hauls made once every 3 weeks at each new station. Some 45 stations now make up the cruise pattern.

Data thus far analyzed indicate that the longspine porgy, Stenotomus caprinus, pre-

dominates over the sampling area. Its contribution to the total catch (accumulated since January) was 53 and 40 percent by number and weight, respectively. Other important species included the silver sea trout, Cynoscion nothus, shoal flounder, Syacium gunteri; Atlantic croaker, Micropogon undulatus; rock sea bass, Centropristes philadelphicus; and lizardfish, Synodus foetens.

Longspine porgies examined to date have fallen within the total length range of 60 to 195 mm., their average length varying with sampling depth. Ripe or spent females have only been taken during the period January through May at depths of 25 to 45 fathoms. A study to explore the feasibility of using porgy scales to determine population age composition was begun at the close of the quarter.

Note: See Commercial Fisheries Review, June 1961 p. 24.

Gulf of Mexico Fishing Industry

HURRICANE "CARLA" INFLICTS HEAVY DAMAGE:

Hurricane "Carla" struck the Texas coast on September 11, 1961. The storm's greatest impact was in the Matagorda Bay area. Many segments of the fishing industry in the area were damaged. Considering the intensity of the storm, vessel losses were light. But there were a number of total losses and a number of vessels that suffered major damage. Shore plants and other facilities, especially at Port O'Connor, Port Lavaca, Palacios, Freeport, and over a sizable portion of the Texas coast, were damaged more or less substantially. There was some damage to fishery shore plants by flooding in the Louisiana coastal area. But because of ample warnings by the U. S. Weather Bureau, losses were somewhat less than expected.

Fig. 1 - Before Hurricane "Carla," on this site in Texas were located a State biological laboratory, a crab plant, and several other small buildings.

U. S. Bureau of Commercial Fisheries laboratory facilities at Galveston, which received the full force of the storm, were damaged to some extent but not severely. None of the other Bureau facilities in other Gulf Coast areas were damaged.

Shrimp landings on the upper Texas Coast were light after the storm, but landings on the lower Texas Coast were heavy early in October for a few days. However, the rate of catch was not maintained and landings became light again after the short spurt of good fishing.

Hurricane "Carla" developed as a tropical storm in the Caribbean off Nicaragua on September 4. It moved northward and developed full hurricane strength after striking the north end of Yucatan Peninsula on September 7. It moved due north for most of the following day during which a hurricane watch was maintained and the Weather Bureau issued warnings that "Carla" was the most dangerous hurricane in the history of the Weather Bureau. It was reported to have an eye 50 miles in diameter with winds of 150 miles an hour at its center. "Carla" ultimately struck the coast, with the center of the storm at Matagorda Bay, on the morning of September 11.

The shrimp industry, generally centered on the Texas coast in September, suffered heavy damage from Hurricane "Carla." The storm damage created a particularly difficult situation in the Gulf Coast commercial fisheries, having followed a very poor shrimp production season.

The damage to fishery facilities on the Gulf Coast from east to west appeared to be as follows:

Louisiana: Extremely high tides in southern Louisiana resulted in some damage to shore plants. Machinery in canning plants in Terrebonne Parish was damaged.

Port Arthur-Sabine: There was minor water damage to shore plants in that area, and there may be some loss to fish meal as a result of flooding. These plants, however, are back in operation.

Galveston: Shore installations handling fishery products in Galveston suffered only minor damage and the fleet escaped serious loss. Some vessels that sought refuge in

the Houston Ship Channel were deposited on shore or docks when the 17-foot water level subsided.

Freeport: Shore plant installations at Freeport were heavily damaged, and two shore plants were completely destroyed. Twelve shrimp vessels at Freeport were known to be aground and 5 were sunk. Others were reported to have sought refuge up the river where they were trapped by debris. Much of Freeport after the storm was under water.

Fig. 2 - After Hurricane "Carla," this is what remained of a crab-picking plant located on this bulkhead in Palacios, Tex.

Port O'Connor, Palacios, and Port Lavaca: All in Matagorda Bay and directly in the path of the storm suffered severe damage. In Port O'Connor shore plant installations, docks, and boats were all gone, and only three houses in the town were left intact. At Palacios all shore installations were destroyed and vessels were carried inland and apparently were extensively damaged. At Port Lavaca shore plant installations were severely damaged.

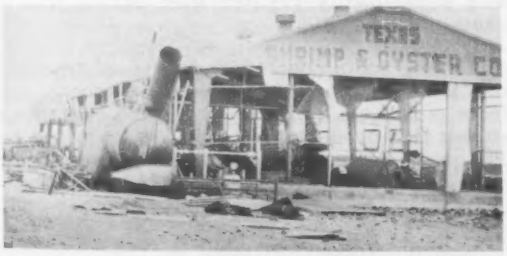


Fig. 3 - Damage inflicted by Hurricane "Carla" to a shrimp and oyster plant at Palacios, Tex.

Seadrift: Shore plant installations and a new crab picking and oyster shucking plant, scheduled to open in September, were completely destroyed. Boat sheds and other buildings were also destroyed.

Rockport: Damage was less extensive, but many shrimp boats were left high and dry by receding tides, and two vessels were reported missing. Repairs to shore plant installations were expected to be completed in a relatively short time.

Fig. 4 - These shrimp vessels, which rode out Hurricane "Carla" in the new boat basin at Rockport, Tex., were beached by receding tides. Damage was not serious for these vessels.

Aransas Pass and Corpus Christi: Damage to shore plants and vessels in that area was relatively minor. Two vessels were reported lost and one was sunk at its mooring, but may be salvaged.

Brownsville: Brownsville experienced winds not exceeding 40 miles an hour. Little or no damage occurred in that area and business was normal.

Hawaii

COMMERCIAL FISHERY LANDINGS, JULY 1960-JUNE 1961:

Commercial fisheries landings of sea and pond fish in the State of Hawaii during the fiscal year July 1960-June 1961 amounted to 13.7 million pounds valued at $2.9 million ex-vessel, according to the Hawaiian Division of Fish and Game. Landings of tuna made up 84.7 percent of the quantity and 65.5 percent of the value of all fishery landings. Skipjack tuna was the most important species landed.

Table 1 - Hawaiian Commercial Fishery Landings and Ex-Vessel Value, July 1960-June 1961

Species		Quantity	Value
English Name	Hawaiian Name	1,000 Lbs.	$1,000
Ocean Catch:			
Amberjack	Kahala	80	25
Big-eyed scad	Akule	301	205
Dolphin	Mahimahi	108	48
Goatfish	Weke-ula, Weke, Moelua, Moano Kumu, Malu	152	83
Crevalles	Ulua Omilu	82	39

(Table continued on next page.)

Table 1 - Hawaiian Commercial Fishery Landings and Ex-Vessel Value, July 1960-June 1961 (Contd.)

Species		Quantity	Value
English Name	Hawaiian Name		
		1,000 Lbs.	$1,000
Mackerel	Opelu	214	89
Snappers:			
Gray	Uku	42	19
Pink	Opakapaka / Kalekale	99	50
Red	Ulaula koae, ehu or Ulaula	54	47
Swordfishes, sailfishes spearfishes, & marlins	A'u & A'u lepe	618	170
Tuna & tunalike fish:			
Albacore	Ahipalaha (tonbo)	8	2
Big-eyed		982	492
Yellowfin	Ahi	416	171
Skipjack	Aku	10,194	1,271
Bonito or little tuna	Kawakawa	1	1/
Shellfish:			
Crabs	Kuahohu, Kona, Papai, Samoan, Moala	20	12
Limpet	Opihi	10	4
Lobster, spiny	Ula	13	9
Octopus	Hee	4	2
Squid	Muhee	5	2
Other fish & shellfish		267	110
Total Ocean Catch		13,670	2,850
Pond Catch		61	48
Grand Total		13,731	2,898

1/Less than $500.

The Island of Oahu accounted for 10.7 million pounds (valued at about $2.3 million) or 78.1 percent of the quantity and 78.5 percent of the total value of all landings of sea and pondfish and shellfish in the fiscal year ending June 30, 1961. The Island of Hawaii was the second most important center of Hawaii's fishing industry and accounted for 11.7 percent of the total landings, and 12.6 percent of the total value. Landings of commercial fish and shellfish in the Islands of Maui, Lanai, Molokai, Kauai were quite light.

Table 2 - Hawaiian Commercial Fishery Landings by Islands, July 1960-June 1961

Island	Sea Catch		Pond Catch		Total Catch	
	Quantity	Value	Quantity	Value	Quantity	Value
	1,000 Lbs.	$1,000	1,000 Lbs.	$1,000	1,000 Lbs.	$1,000
Hawaii	1,602	366	1	1/	1,603	366
Maui	1,201	164	-	-	1,201	164
Lanai	14	5	-	-	14	5
Molokai	25	12	1	1	26	13
Oahu	10,660	2,229	59	47	10,719	2,276
Kauai	168	74	-	-	168	74
Total	13,670	2,850	61	48	13,731	2,898

1/Less than $500.

Landings of commercial fish and shellfish in the Hawaiian Islands during July 1960-June 1961 by months were heaviest during the summer and early fall months. The July-September 1960 period and the May-June 1961 period accounted for 63.2 percent of the total landings. June 1961 alone accounted for 22.7 percent of the total landings. Landings of commercial fish and shellfish in the Hawaiian Islands are dominated by the seasonal availability of skipjack tuna. The fishery for tuna is the most important fishery in the Islands.

Table 3 - Hawaiian Commercial Fishery Landings by Months, July 1960-June 1961

Month	Sea Catch		Pond Catch		Total Catch	
	Quantity	Value	Quantity	Value	Quantity	Value
	1,000 Lbs.	$1,000	1,000 Lbs.	$1,000	1,000 Lbs.	$1,000
1960						
July	1,726	305	2	1	1,728	306
August	1,637	276	2	2	1,639	278
September	944	208	5	4	949	212
October	754	205	4	3	758	208
November	554	199	5	4	559	203
December	780	257	6	5	786	262
1961						
January	667	169	11	10	678	179
February	440	150	9	7	449	157
March	902	226	3	1	905	227
April	911	208	4	3	915	211
May	1,240	218	6	5	1,246	223
June	3,115	429	4	3	3,119	432
Total	13,670	2,850	61	48	13,731	2,898

Note: See Commercial Fisheries Review, November 1960 p. 36.

Industrial Products

U. S. FISH MEAL, OIL, AND SOLUBLES: Production, January-September 1961: Although the production of meal, oil, and solubles during September was less, the quantity processed January-September 1961 was significantly greater than during the same period in 1960.

During September 1961, fish meal production amounted to 29,000 tons--87 percent from menhaden. Fish solubles and homogenized fish produced totaled 11,400 tons. The production of marine-animal oils totaled

Fully loaded menhaden vessel approaching a reduction plant in Empire, La.

U. S. Production of Fish Meal, Oil, and Solubles, September 1961 1/ with Comparative Data

Product	September 1961	September 1960	January-September 1961	January-September 1960	Total 1960
			(Short Tons)		
Fish Meal and Scrap:					
Alewife	-	-	89	1,092	1,092
Herring:					
Alaska	296	1,857	3,576	6,103	6,103
Maine	101	290	984	2,486	2,915
Menhaden 2/	24,930	32,244	216,834	183,849	218,423
Sardine, Pacific	688	1,102	688	1,222	3,301
Tuna and mackerel	1,958	1,348	15,416	20,705	26,325
Unclassified	669	1,748	11,058	17,643	21,279
Total	28,642	38,589	248,645	233,100	279,438
Shellfish and marine-animal meal and scrap	3/	3/	3/	3/	10,309
Grand total meal and scrap	3/	3/	3/	3/	289,747
Fish solubles	10,485	11,442	82,071	76,564	89,377
Homogenized condensed fish	930	1,131	9,532	8,752	9,552
			(Gallons)		
Oil, body:					
Alewife	-	-	6,900	66,121	66,121
Herring:					
Alaska	51,786	415,086	625,786	1,385,218	1,385,218
Maine	4/	27,395	4/	129,795	132,973
Menhaden 2/	2,971,984	3,557,583	26,523,074	19,099,274	24,453,736
Sardine, Pacific	22,851	62,760	22,851	73,896	143,654
Tuna and mackerel	109,968	48,907	485,145	369,113	507,180
Other (including whale)	67,635	243,174	956,689	1,041,062	1,137,527
Total oil	3,224,224	4,354,905	28,620,445	22,164,479	27,826,409

1/Preliminary data.
2/Includes a small quantity produced from thread herring.
3/Not available on a monthly basis.
4/Included in "Other" in order to avoid disclosure of the production of individual firms.
Note: Excludes liver oils.

3.2 million gallons--92 percent from menhaden. Compared with August 1960, production was down 26 percent for fish meal, 9 percent for fish solubles and homogenized fish, and 26 percent for marine-animal oils.

Fish meal processed during the first nine months of 1961 amounted to 248,600 tons--15,500 tons greater than in the same period of the previous year. Fish solubles and homogenized fish production totaled 10,500 tons--1,000 tons greater than in the same period in 1960. The first nine-months production of marine animal oil amounted to 3.2 million gallons--1.1 million gallons less than during the same period in 1960.

* * * * *

Production and Imports, January-August 1961: The total United States supply of fish meal for the first 8 months of 1961 amounted to 365,800 tons--83,400 tons above the same period of 1960. The domestic production accounted for 60 percent and imports 40 percent of the total for the first 8 months of 1961.

Menhaden Plant

U. S. Supply of Fish Meal and Solubles, January-August 1961 and Comparative Data

Item	January-August 1961	January-August 1960	Total 1960
		(Short Tons)	
Fish Meal and Scrap:			
Domestic production:			
Menhaden	192,460	151,605	218,423
Tuna and mackerel	13,458	19,357	26,325
Herring, Alaska	3,280	4,246	6,103
Other	11,361	19,303	38,896
Total production	1/220,559	1/194,511	289,747
Imports:			
Canada	29,590	26,459	30,982
Peru	93,370	44,164	68,156
Chile	9,743	11,019	21,183
Angola	1,543	360	888
Republic of South Africa	9,756	5,509	7,073
Other countries	1,197	335	3,279
Total imports	145,199	87,846	131,561
Available fish meal supply	365,758	282,357	421,308
Fish Solubles:			
Domestic production 2/	80,188	72,743	98,929
Imports:			
Canada	819	771	869
Denmark	28	1,858	1,858
Other countries	1,398	165	447
Total imports	2,245	2,279	3,174
Available fish solubles supply	82,433	75,537	102,103

1/Preliminary. Based on reports from firms which accounted for 96 percent of the 1960 total production.
2/50 percent solids. Includes production of homogenized condensed fish.

Fish meal produced by United States firms during January-August 1961 totaled 220,600 tons. Fish meal processed from menhaden accounted for 87 percent of that total. Fish

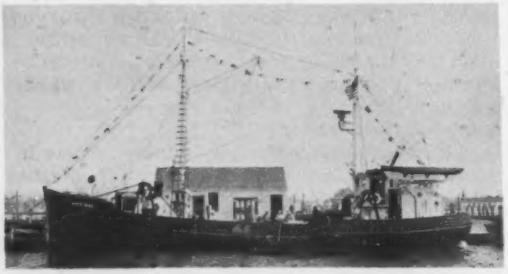
meal imports from foreign countries during January-August 1961 amounted to 145,200 tons--up 57,400 tons from the same period in 1960. Imports from Peru made up 64 percent and those from Canada accounted for 20 percent of the imports in the first 8 months of 1961.

The United States supply of fish solubles (including homogenized condensed fish) during January-August 1961 was 6,900 tons above the supply for the same period in 1960. The domestic production amounted to 80,200 tons, while imports totaled 2,200 tons.

Marine Game Fish

RESEARCH AIDED BY LOAN OF VESSEL:

A large New Jersey fish reduction firm has offered, and the U. S. Bureau of Sport Fisheries and Wildlife has accepted, use of its research vessel Cape May for two months in the Middle Atlantic area. The ship is fully equipped with navigational, communication, and safety equipment and manned with deck and engineering officers and cook; fuel and maintenance and vessel and crew insurance will be furnished.



M/V Cape May, belonging to a New Jersey fish-reduction firm, will be used to extend shore-bound marine game fish research between Fire Island, N. Y., and Delaware Bay.

The offer is made because of concern about the abundance and danger of sharks in waters off the New Jersey resorts (two persons were attacked last season). This offer gives vessel time worth as much as $1,000 a day to the Bureau and the opportunity for extending its shore-bound marine game fish research into the coastal waters between Fire Island, N. Y., and Delaware Bay.

Use of the vessel has been fully coordinated with the U. S. Bureau of Commercial Fisheries and the New Jersey Division of Fish and Game. A Bureau of Commercial Fisheries biologist has been assigned full time to the vessel for the two-month period; other units of the Bureau have loaned special gear; and a New Jersey biologist will take part in the 10 planned cruises. Around-the-clock fishing and plankton sampling will add to knowledge about shark predation on game fish as well as on game fish abundance, species, distribution in space and time, useful data on environmental conditions, and on spawning of game fish as revealed through examination of the plankton for eggs and larvae.

Marketing

EDIBLE FISHERY PRODUCTS PROSPECTS, WINTER 1961/62:

During the next several months per capita consumption of food fishery products by civilians in the United States is expected to be close to the year-earlier rate. Supplies of important commercially-processed fish and shellfish are expected to be about equal to the level of the previous year. Retail prices of food fishery products are likely to remain at least moderately higher this season than last.

About as much food fishery products are expected through the winter months this year as last. Stocks of frozen fish were noticeably lower at the beginning of the fall than at the same time last year, and the seasonal decline in production will continue through February 1962. However, imports, particularly of the fresh and frozen items, are likely to continue greater than a year ago. Supplies of canned salmon will be much larger this season than last and those of tuna about as large. Declines are indicated for canned sardines--both the California and the Maine products. The catch of Maine sardines through mid-October has been only one-third of the year-earlier catch.

Exports of edible fishery products in the coming months may total no larger than a year earlier. The outmovement of canned salmon may be up a little but decreases are expected in canned California pilchards and mackerel.

This analysis appeared in a report prepared by the Agricultural Marketing Service, U. S. Department of Agriculture, in cooperation with the Bureau of Commercial Fisheries, U. S. Department of the Interior, and published in the former agency's November 1961 issue of The National Food Situation (NFS-98).

North Atlantic Fisheries Exploration and Gear Research

MIDWATER TRAWLING OPERATIONS COMPLETED FOR 1961:

M/V "Delaware" Cruise 61-18: The fourth in a series of cruises devoted to definition of the potential fishery resources of the midwater zone over the Continental Shelf off the Northeastern United States was carried out (October 10-18, 1961) by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Delaware.

Hauling back 85-foot nylon midwater trawl aboard the M/V Delaware.

Scouting was carried on over broad areas of the Gulf of Maine, Georges Bank and adjacent waters. Sonic equipment was used continuously in an effort to locate shoals of fish for fishing tests with midwater trawl nets. No significant aggregations of fish were found in the mid-depths.

A midwater trawl net was set only six times during the 9-day cruise; the small catches made included the following species: haddock, silver hake (whiting), butterfish, herring, and dogfish.

The completion of this cruise terminated the Delaware's activity in midwater trawling operations for 1961. This work will continue on an intermittent basis aboard the 65-foot research vessel T-476 through the winter season.

Note: Also see Commercial Fisheries Review, Nov. 1961 p. 25.

North Atlantic Fisheries Investigations

GROUNDFISH SURVEY OFF NEW ENGLAND:

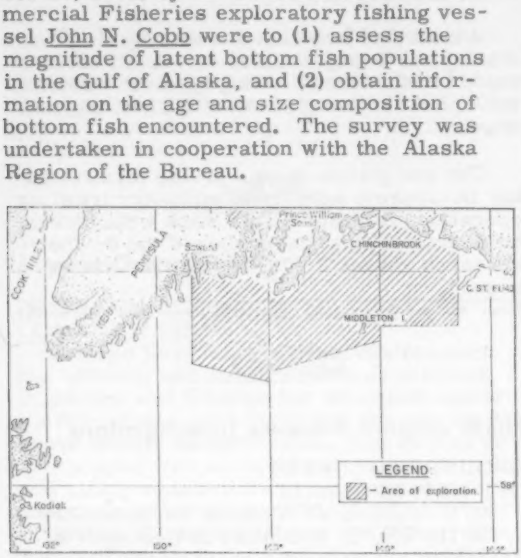
M/V "Delaware" (October 25-November 6, 1961): The U. S. Bureau of Commercial Fisheries exploratory fishing vessel Delaware completed on November 6, 1961, the first part of an extensive groundfish survey which includes sampling the fish populations from the Gulf of Maine, Browns Bank off Nova Scotia, Georges Bank, and southward to Hudson Canyon.

The vessel fished at selected stations in the Gulf of Maine, Browns Bank, the northern edge of Georges Bank, and the Great South Channel. Biological information collected included blood samples from several of the important commercial species; age and growth material from haddock, cod, longfin hake, and argentines; and whiting stomachs. A sample of the invertebrates caught at each station was preserved and returned to the laboratory. Special collections of young haddock, ocean perch, dogfish, and cunners were made for further study. Hydrographic observations were made throughout the cruise.

North Pacific Exploratory Fishery Program

EXPLORATORY TRAWLING FOR BOTTOM FISH IN GULF OF ALASKA:

M/V "John N. Cobb" Cruise 52: Primary objectives of an 8-week cruise (ended October 27, 1961) by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel John N. Cobb were to (1) assess the magnitude of latent bottom fish populations in the Gulf of Alaska, and (2) obtain information on the age and size composition of bottom fish encountered. The survey was undertaken in cooperation with the Alaska Region of the Bureau.



Exploratory fishing vessel M/V John N. Cobb Cruise 52 (Sept.-Oct. 1961).

The area of exploration extended from Cape St. Elias to Cape Resurrection. A commercial-size otter-trawl net was used to sample bottom fish populations within the region. Catch information obtained during the exploration is now being analyzed by the Bureau.

Otoliths ("ear bones") and scales were removed from sablefish, true cod, flatfish, and several species of rockfish to provide information on their age and growth.

Adverse weather conditions seriously hampered exploratory fishing operations during much of the cruise.

Note: Also see Commercial Fisheries Review, October 1961 p. 24.

Oysters

DELAWARE BAY SURVIVAL IMPROVED:

A decided improvement in survival of oysters in Delaware Bay in 1961 was reported in October 1961. The usual late summer kill by MSX did not occur in native or imported oysters, according to a news release from the Virginia Fisheries Laboratory at Gloucester Point, Va. The Director of the Shellfish Laboratory of Rutgers University reported to the Shallow Water Conference in Baltimore, Md., that Delaware oystermen planted approximately 160,000 bushels of large oysters from up-Bay seed beds in May 1961. This fall they are marketing these oysters and survival has been excellent. The seed oysters were large because none had been taken from the seed beds since 1958. Therefore, only a short period of growth and fattening was needed before marketing. It ought to be emphasized that it is not clear what damage MSX would do in Delaware beds if oysters were held the full 2- or 3-year term usually needed to produce market oysters.

Planters in MSX-infected areas of Chesapeake Bay should be encouraged by events in Delaware Bay. The beginning of the epidemic in Chesapeake Bay was almost exactly two years behind the onset in Delaware Bay. Nevertheless scientists at the Virginia laboratory are urging oystermen to continue making trial plantings to detect any improvement in survival of oysters. The laboratory is also monitoring major growing areas but cannot follow conditions in all minor tributaries.

Improved survival can lead to short-term plantings and if successful to longer-term plantings later. One danger is that MSX will wait until beds are heavily planted before giving rise to another serious epidemic.

Recent tests of Virginia oysters indicate no further spread of MSX. In fact, above Urbanna in the Rappahannock River, MSX was found higher in the river in 1959 than in 1961. This suggests that MSX has reached its limit in low salinity waters. Some fluctuations from wet to dry years can be expected however.

* * * * *

USE OF GROUNDS IN LOW-SALINITY WATER URGED:

Oystermen in Virginia are re-appraising their farming operations to meet the demand for market oysters resulting from or following the destruction of large plantings by the protozoan parasite MSX. As has been pointed out by scientists of the Virginia Institute of

Marine Science at Gloucester Point, MSX apparently is checked by low-salinity water. Oysters tolerate a larger range of saltiness than most of their enemies and pests, and grow well in salty ocean water, brackish water of creeks, and in all degrees of saltiness in between.

The Virginia scientists at Gloucester Point have pinpointed areas infested by this microparasite, and are now urging full use of grounds in low-salinity waters. Favorable areas should be the York River above Clay Bank, the Rappahannock above Urbanna and Towles Point, and those small rivers and creeks on the above named rivers, the Potomac, and waters of the Bayside of Eastern Shore where salinities are low in spring and not too high in late summer.

Oystermen can judge where it is safe to plant by the presence or absence of mortality in late 1961. If heavy unexplained losses which follow the pattern of MSX kills have occurred, there are strong reasons to suspect that MSX is active.

Undoubtedly many fine oysters can be grown in the numerous low-salinity creeks in Virginia. Big planters have avoided creeks because the oyster beds there must necessarily be small and small beds do not lend themselves to the use of large boats and heavy dredges.

High prices now being paid for market oysters should encourage operators to farm small acreages, using small boats and light equipment, and making the best use of present knowledge of oyster culture. Plants with small acreages can carry out such practices in waters near their homes.

More planters should attempt to collect their own seed oysters, where it is possible. For years oystermen have known that seed oysters produced near the grounds where they are to be planted survive best.

The use of shells in wire bags for culch is increasing each season. Shells in wire bags catch more spat than loose shells and often provide adequate strikes of young oysters in otherwise marginal setting areas.

The increased value of oysters may make it profitable to prepare soft bottoms for planting by stiffening them with shells. Perhaps tray culture will become profitable in spite of high costs of operation.

Pacific Coast

FIELD HEARINGS HELD ON FISHERY PROBLEMS:

A series of field hearings were held on the Pacific Coast and in Alaska, to seek some answers to fishery problems. Senator Warren G. Magnuson (D. Wash.) Chairman of the Merchant Marine and Fisheries Subcommittee of the Senate Committee on Commerce, announced the hearings on September 20, 1961. The first of the hearings was held in San Rafael, Calif., on October 4, with Senator Clair Engle of California as hearing Chairman.

On October 12, 1961, Senator Warren G. Magnuson (Wash.), Chairman of the Merchant Marine and Fisheries Subcommittee of the Senate Committee on Commerce, conducted a hearing on fishery problems. Senator E. L. Bartlett (Alaska), also scheduled a series of hearings in Alaska: October 17, Dillingham; October 18, Naknek; October 19, Kodiak; October 23 and 24, Anchorage; October 25, Ketchikan; October 26 and 27, Juneau. The hearings at Anchorage covered other subjects than fisheries.

State fish and game authorities of the Pacific Coast states participated in the hearings, together with Federal agency officials, representatives of commercial and sport fishery groups, biologists, and oceanographers.

Stepped-up fishery research efforts and application of research findings towards solution of the problems of the industry were a major objective of the Committee's overall study. More active cooperation of State, Federal, and industry officials also must be achieved, Senator Magnuson stated, so that every possible source may be tapped that might help in any way towards rehabilitation of this most important economic resource.

Pacific Ocean

DISCOVERY OF 34 SEAMOUNTS UNDER PACIFIC REPORTED:

A long chain of mountains hitherto unknown to man has been discovered under the North Pacific Ocean by the U. S. Department of Commerce Coast and Geodetic Survey Ship Pioneer, the Secretary of Commerce reported on October 14, 1961.

The seamounts, 34 of them rising 3,000 to 6,000 feet and extending over a 1,000-mile area, are only the first of many

new discoveries expected from "the first methodical ocean-wide survey in modern history" begun in April by the Pioneer. The ship will eventually comb 3 million square miles of ocean between the Hawaiian Islands and Aleutian Islands. The newly discovered mountains lie in the area just south of Alaska and the Aleutians, extending about half the distance from Alaska to the Hawaiian Islands.

In this extensive program of oceanographic, weather, and geologic studies, the Pioneer is following closely spaced courses in a north-south direction between Oahu and the Aleutian trench. Although seamounts of 3,000 to 6,000 feet are not uncommon in the Pacific Basin, the discovery of the 34 mountains in this particular area gives oceanographers a different picture of the bottom topography than hitherto suspected.

Actually, only the gross features of shape and structure are known of 90 percent of the ocean floor that lies beyond the Continental Shelf. The 34 seamounts discovered by the Pioneer lie in an area where existing charts only sparsely define the true depths and bottom configuration.

The discovery of the seamounts is one of the many surprises that have been encountered in our efforts to learn more about the ocean floor. To open many new oceanographic frontiers, the Pioneer, equipped with the latest scientific devices, has been assigned its new and novel mission.

Until now, oceanwide investigations have been only incidental byproducts of more specific coastal missions. Survey ships, for example, have been mapping the Gulf of Alaska for years on their way to and from their coastal working areas, but this deep-sea reconnaissance work has been economically carried out by the Bureau with a minimum effort. It has, however, provided valuable data on some features of the ocean bottom such as disclosing submarine trenches, the Continental Shelf, and undersea mountains.

Systematic oceanwide surveys, such as that now underway by the Pioneer, have been made possible by advances in new techniques of echo-sounding and positioning of ships.

Determination of the depths of the water and the accurate location of the spot at which the depth is determined are required in such surveying. The Pioneer is equipped with the most modern echo-sounding equipment and a long range control system known as Loran C. The recent construction of Loran C stations in Hawaii and Alaska have extended reliable radio signals for positioning ships thousands of miles into the North Pacific Ocean.

Echo-sounding determines depths indirectly by the measurement of time interval required for a sound wave to travel from the survey vessel to the bottom of the ocean, and to return as an echo to the ship. Early in the Twentieth Century, depths were measured by dropping a sinker to the bottom on piano wire. It sometimes required hours to accomplish a single sounding at great depths in this manner.

The 34 seamounts were discovered in a period of only five months by the Pioneer. Extending between the 35th and 50th parallels North, the seamounts contrast sharply in height with the depths shown on existing charts. One seamount 6,270 feet high was located where present charts show almost a flat bottom. The top of this mountain is 11,580 feet below the surface of the water.

A seamount is defined as an isolated elevation of the deep-sea floor of about 3,000 feet or more and circular or elliptical in form. Scores of important seamounts have been discovered by Coast and Geodetic Survey vessels in the Gulf of Alaska--some 11,000 feet in height. The Kodiak Seamount Chain is featured by a line of great seamounts extending for 650 miles across the Gulf of Alaska without evidence of intervening sea-floor topography that would normally be expected in a fault zone. Possibly, the same complex sea-

Fig. 1 - Nansen bottle used with oceanographic winch to obtain water samples and temperatures at any depths aboard a Coast and Geodetic survey ship.

Fig. 2 - Sea bottom sampler snapper used aboard a Coast and Geodetic survey ship.

floor topography will be found in the area presently being surveyed by the Pioneer.

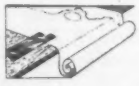
The 311-foot Pioneer carries a complement of 12 officers and 80 crewmen. In addition to hydrography, the ship is equipped with an oceanographic laboratory for processing water samples, bottom cores, biological specimens, and other data. A running log is maintained by the ship regarding current set and drift, changes of water color, areas of phosphorescence, schools of fish, and unique flotsam. Bathythermogram observations are made every two hours at 450-foot depths, and supplemental water temperatures are taken at 900-foot depths every 4 hours.

An observer from Commerce's Weather Bureau releases weather balloons daily, and transmits this information to stations ashore at six-hour intervals. Geologic and gravity studies are also part of this comprehensive survey. A proton magnetometer is towed about 97-percent of the time.

As the Pioneer's systematic surveys progress westward in the seasons to come, oceanographers will begin piecing together the general pattern of sea-floor topography for the North Central Pacific. West of the W. 165th Meridian existing data on the depth and character of the sea floor become even more fragmentary.

In addition to the knowledge gained on sea-floor topography, oceanwide surveys will contribute towards a better understanding of marine meteorology, organic matter in the oceans, the fields of submarine and surface navigation, the utilization of mineral as well as fisheries resources, and the discovery of new concepts which will inevitably come from the accumulated information supplied by a thorough survey program.

The discovery of the seamounts is only a teaser in man's hungry quest for knowledge of the ocean frontier--a frontier comprising two-thirds of the earth's surface about which he is grossly ignorant.



Pollution

MARITIME ADMINISTRATION ATTACKS OIL POLLUTION OF THE SEAS:

Oil is seriously troubling the coastal waters of the United States, Canada, and other nations. Resorters frequently find their beaches fouled by oily water, birds find their coastal feeding grounds ruined by oil and die of starvation, and fish are poisoned by oil. This oil is discharged by merchant ships, and the damage is the penalty paid for progress in substituting fuel oil for wind or coal to drive the world's commercial vessels.

But the U.S. Department of Commerce's Maritime Administration is taking a major step toward greatly decreasing sea pollution by oil in launching a research and development project to develop an effective oil-water separator.

Most of the current oil pollution is the result of ships pumping out their ballast before entering port. The majority of ships today, at least in the U. S. Merchant Marine, are steam-turbine-driven vessels using oil-fired boilers. The oil is a residual oil from the petroleum refining process known as "Bunker C," which has a specific gravity which enables it to mix with sea water.

The fuel is stored in tanks which form the bottom of the ship, and as the fuel is used from individual tanks these tanks must be filled with sea water to maintain stability and safety of the ship on the ocean. About fifty miles out of port, the ships pump out their sea-water ballast. But oil residue in the tanks has mixed with the water and also is pumped into the sea.

Although the volume of fuel oil thus discharged by a single ship is only about 100 gallons, there are thousands of ships discharging this oil each year off the U. S. coasts.

The damage caused by this vast total amount of oil to present and potential recreational areas and private property is extensive, the Maritime Administration reports. Even when ballast water is discharged beyond the 50-mile limit, some floats ashore. The tides bring oil to many non-shipping areas, killing many edible forms of marine life and thousands of wild birds each year.

The problem is world-wide, as was recognized in London in 1954 when the International Convention for the Prevention of Pollution of the Seas by Oil was drafted. This Convention forbids ships to discharge persistent oil or oily residue within certain sea areas, or to discharge water which contains more than 100 parts per million of oil.

In addition, some ships are equipped with "single gravity type" oil-water separators, but this equipment is not effective in separating oil from water when both have essentially the same specific gravity, as is the usual case with Bunker C oil.

The Maritime Administration's research contract calls for the development of a unit capable of effective and continuous separa-

tion of Bunker C oil from water. The device must be simple in design, fully automatic in its operation, and so constructed as to require minimum maintenance and attention.

The process should be able to treat an oil-water mixture whose oil concentration may vary from 0 to 100 percent at any one time, while the water mixture may be either fresh or salt with a temperature range of about 40° F. to 80° F. Separation is to be at a rate of not less than 600 gallons per minute, and the water discharge should contain less than 20 parts per million of oil. The over-all design considerations are based on the requirements contained in "Circular of Requirements" issued by the Maritime Administration.

Successful development of the separator will go a long way toward fulfilling Maritime's obligation to pursue research as an active member of the U. S. National Committee for the Prevention of Pollution of the Seas by Fuel Oil, Maritime Administration officials believe.

Shrimp

UNITED STATES LANDINGS AND STOCKS DOWN:

South Atlantic and Gulf shrimp landings of 62.0 million pounds during January through September 1961 were 35.8 million pounds or 37 percent less than in the same period of 1960. Landings in that area represent over 95 percent of the total amount landed in the United States.

During August and September (the normal heavy producing months) only 20.5 million pounds were landed, or slightly more than half of the 39.2 million pounds landed in the same two months in 1960. Preliminary reports indicated that the trend of sharply decreased shrimp landings in the Gulf continued through most of October. In September 1961, after hurricane "Carla" hit the Gulf Coast, there was a short spurt of landings of brown shrimp from the western Gulf area, but landings dropped off to a low level again in a week.

The United States cold-storage holdings of raw headless shrimp as of September 30, 1961, of 13.4 million pounds were 10.2 million pounds or 43 percent below the September 30, 1960, holdings of 23.6 million pounds. The September 1961 holdings of other frozen shrimp (breaded, peeled and deveined, etc.) of 7.4 million pounds were 4.3 million pounds or 37 percent below those of a year earlier. A sizable amount of the stocks in storage were committed and were not actually on the market.

Shrimp trawler docked at Biloxi, Miss.

While United States fresh and frozen shrimp imports through August this year of 70.7 million pounds were 5.6 million pounds or 9 percent above 1960 imports for the same period, the increase did not offset the drop in domestic production nor change the over-all tight supply situation.

Although wholesale prices were higher than a year ago, the demand continued to exceed the supply. The market for shrimp was strong with supplies very limited.

* * * * *

UNITED STATES SHRIMP SUPPLY INDICATORS AS OF NOVEMBER 2, 1961:

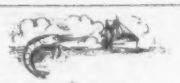
Item and Period	1961	1960	1959	1958	1957
	..... (1,000 Lbs., Heads-Off)				
Total landings, S. Atl. & Gulf States:					
November	1/	14,454	12,412	12,416	9,302
October	12,700	21,690	19,602	16,461	14,256
September	9,534	18,832	18,330	15,847	13,673
January-October ..	74,744	119,484	109,531	96,037	100,218
January-December .	1/	141,085	130,659	116,552	116,238

(Table continued on next page.)

United States Shrimp Supply Indicators as of November 2, 1961 (Contd.)

Item and Period	1961	1960	1959	1958	1957
	(1,000 Lbs., Heads-Off)				
Quantity used for canning, Gulf States 2/:					
November	1/	1,614	2,312	3,424	953
October	1,485	2,567	2,531	3,489	1,616
September	630	2,236	2,108	2,825	1,506
January-October	11,862	26,003	21,089	21,037	16,551
January-December	1/	28,594	24,679	26,404	18,386
Frozen inventory (as of end of each month)--raw headless only 3/:					
November	1/	37,264	37,334	30,211	22,326
October	1/	31,209	33,057	24,620	20,362
September	13,361	24,492	26,169	18,079	16,896
August	12,728	20,171	23,780	15,274	10,867
January-December monthly avg.	1/	25,954	27,297	18,008	13,627
Imports 4/:					
November	1/	13,516	10,269	10,617	6,789
October	1/	14,211	15,340	11,463	9,237
September	1/	8,190	7,541	7,620	7,471
August	6,743	6,407	5,107	6,628	4,959
January-August	70,546	65,091	62,794	45,246	39,315
January-December	1/	113,419	106,555	85,393	69,677

1/Not available.
2/Pounds of headless shrimp determined by multiplying the number of standard cases by 33.
3/Shrimp products other than raw headless not included.
4/Includes fresh, frozen, canned, dried, and other shrimp products as reported by U. S. Bureau of the Census.
Note: Data for 1961 are preliminary. October 1961 data estimated from information published daily by the New Orleans Fishery Market News Service. To convert shrimp to heads-on weight multiply by 1.68.



South Atlantic Exploratory Fishery Program

FISH AND SHELLFISH EXPLORATION OFF GEORGIA AND FLORIDA CONTINUED:

M/V "Silver Bay" Cruise 33: On October 6, 1961, the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Silver Bay completed an 18-day exploratory fishing cruise off Georgia and the east coast of Florida. The first portion of the cruise was devoted to additional scallop dredging on the Cape Canaveral, Fla., bed and the second portion was devoted to offshore pelagic fish explorations.

Commercial concentrations of optimum size (50-55 mm.) calico scallops were found to exist over approximately a 40-square-mile area near Bethel Shoal in the 20-25 fathom depth range. Catches within this area (bounded by the latitudes 27° 36' N. to 27° 56' N.) ranged from 2½ bushels per 15-minute drag to a high of 20 bushels per 5-minute drag. Actual fishing time (170 minutes) with an eight-foot tumbler dredge at one location (27°53.5' N., 80°08' W.) produced 143 bushels of scallops. Meat condition was excellent--yielding 5 to 5½ pints per 72-pound bushel, and counting 76 to 80 individual meats per pound.

An extensive concentration of small (20-40 mm.), presumably "young-of-the-year," scallops was located off Cape Canaveral in the 15- to 25-fathom depth range. Within this area (bounded by the latitudes 28°02' N. to 28°27' N.) individual catches of small scallops ranged as high as 25 bushels (estimated 62,000 individuals) per 15-minute tow. Previous observations made aboard the Silver Bay indicate that the scallops should reach a commercial size within 3 to 5 months.

Dredging north of Cape Canaveral, in the 18- to 50-fathom depth range, produced generally negative results, but one 15-minute drag near 29°18' N., 80°15' W., in 35-fathoms, resulted in a 5-bushel catch of optimum size scallops.

Scallop samples and specimens were provided for industry and Bureau technologists and biologists.

Midwater trawling and tuna long-line explorations were initiated in the offshore waters of northern Florida. Long-line sets on the 500 and 1,000 fathom isobaths resulted in small catches of yellowfin tuna (Thunnus albacares), albacore (T. alalunga), and big-eyed tuna (T. obesus).

Note: Also see Commercial Fisheries Review, Oct. 1961 p. 28.

Sport Fishery

PACIFIC MARINE SPORT FISHERY RESEARCH:

Vacant buildings in a deactivated naval submarine net depot on San Francisco Bay are destined to become a research center for the Pacific Coast marine sport fishery, the Department of the Interior announced on October 25, 1961. The site will be known as the Tiburon Marine Research Laboratory. At the outset it will occupy two buildings.

The Department's Fish and Wildlife Service said several reasons underlie the establishment of the laboratory in the San Francisco region: A million and a half sport fishermen seek salt-water fish on the West Coast each year and commercial fishing is of extreme importance to the area.

Assignment of the Tiburon structures to the Fish and Wildlife Service was made possible through an agreement between the Service and the Department of the Navy. Other buildings may be acquired as needed.

Tiburon is in Marin County, just north of San Francisco, and is ideally located as to geography and environment. At its door are the ocean, bays, estuaries, and coastal rivers. Geographically it fills a gap in the Federal fishery research program which has long-established investigations for tuna and other fisheries in southern California waters and the big Columbia River research and development program to the north. It is close to transportation facilities, to numerous educational institutions doing considerable research, and is near the headquarters of the California Academy of Sciences. Excellent docks are available to serve the Federal laboratory.

Plans for the new Tiburon Marine Research Laboratory still are being formulated. The center is intended to serve Pacific Coast needs similarly to those provided for the Atlantic Coast by the Sandy Hook Marine Laboratory in New Jersey.

The Sandy Hook Laboratory has been operating a year and has seven biologists and other staff members. One biologist is at Tiburon during the formative period. Like the Sandy Hook Research Laboratory, the Tiburon Laboratory will be under the jurisdiction of the Bureau of Sport Fisheries and Wildlife.

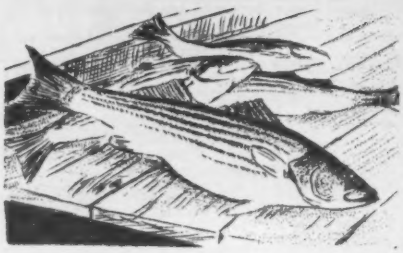
Bureau officials emphasized that when the Pacific marine sport fishery research program is fully operational its work will have been carefully coordinated with private and public research activities seeking answers in the same field.

Striped Bass

CHESAPEAKE BAY FIVE-YEAR MIGRATION STUDY:

News of a five-year study on striped bass movements was made public on October 30, 1961, by the Natural Resources Institute of the University of Maryland. This study was designed to develop new techniques of tagging and, at the same time, supply much needed information about age, growth, availability, and abundance of striped bass in the Chesapeake Bay areas of fishing.

According to the study, the striped bass (rockfish) remained in local waters in various parts of Chesapeake Bay while young. Later, when older, they may leave the Bay for Atlantic Coast points as far away as northern New England. This species contributes extensive angling pleasure and financial return from sportsmen to many tidewater communities. Also, during 1959 the Chesapeake Bay commercial catch totaled 6.14 million pounds valued at $1.1 million ex-vessel.



The first results of a combined effort by Maryland's Chesapeake Biological Laboratory, the Virginia Institute of Marine Science, and the U. S. Fish and Wildlife Service Beaufort Biological Laboratory, indicate that pan-size striped bass stay close to the area of tagging in the Chesapeake Bay area. Over 3,500 fish were tagged in the study, which indicated that most two-year-old striped bass under 12 inches remained in the river where they were first tagged. After reaching the 12-inch size, the fish may travel greater distances, but rarely out of the Bay. Some of the larger fish in the older year-classes moved out of the Bay as far north as Maine, but they were surprisingly few in number.

Research has been progressing in the Potomac River which supports the largest striped bass fishery in the Bay area. Research is also planned for other major tributaries and the Bay proper with goals of determining the natural death rate, numbers available to fisheries, the existence and locations of subpopulations, and the contribution these stocks make to other coastal areas.

Tuna

CALIFORNIA EX-VESSEL PRICES ADVANCE FOR THE THIRD TIME IN 1961:

Effective October 2, 1961, a $10-per ton ex-vessel price increase was announced by Southern California canners for bluefin, skipjack, and yellowfin tuna. The new prices per ton are: bluefin $270, skipjack $230, and yellowfin $280. Previous increases of $10 per ton were made this year on July 1 for bluefin and yellowfin tuna, and on August 25

by $10 per ton for all 3 species. Current ex-vessel prices are $30 per ton more than a year ago for bluefin and yellowfin, and $20 per ton above the 1960 skipjack tuna price.

Current ex-vessel tuna prices are still far below the peak year of 1954, when canners paid $340 for bluefin, $310 for skipjack, and $350 for yellowfin, a range of $70 to $80 per ton above the current prices for those species.

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CALIFORNIA EX-VESSEL PRICES ADVANCE FOR THE FOURTH TIME IN 1961:

Effective October 30, 1961, another $10-per-ton ex-vessel price increase (the fourth this year) was announced by Southern California canners for skipjack and yellowfin tuna. The new prices per ton are: skipjack $240 and yellowfin $290. Bluefin remains at $270 per ton.

The first increase this year of $10 per ton was made on July 1 for bluefin and yellowfin tuna. The second increase of $10 a ton was made on August 25 and applied to bluefin, skipjack, and yellowfin. The third increase, also $10 a ton, was announced on October 2, and applied to the same three species as the second increase.

Current ex-vessel prices are $30 per ton more than a year ago for bluefin and skipjack, and $40 per ton for yellowfin tuna.

Ex-vessel tuna prices at present are at a 6-year high, but are still far below the peak year of 1954 when canners paid $340 for bluefin, $310 for skipjack, and $350 for yellowfin.

* * * * *

CALIFORNIA BLUEFIN EX-VESSEL PRICE ALSO ADVANCED:

Although not involved in the California ex-vessel price dispute for an increase in skipjack and yellowfin tuna prices, the bluefin tuna price was also increased $10 per ton to $280, effective October 30, 1961. This is the fourth price increase for this species since June 1961--the previous ones were announced on July 1, August 25, and October 2; each increase was $10 per ton.

Although the bluefin tuna season normally starts in the spring months in California, the advance was made to retain the previous price differential between the various tuna species.

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CALIFORNIA CANNED TUNA WHOLESALE PRICES INCREASE:

On October 31, 1961, California packers of canned tuna announced general price increases ranging from $0.50 to $1.00 per case at the wholesale level for most styles of their canned tuna packs. This was the third round of price increases since September 1, and followed the increase in raw tuna prices which advanced about $40 per ton (15 percent) since June 1961.

Imported frozen tuna prices have also increased considerably since the first of the year, due to demand exceeding supplies, which in turn firmed up prices for domestic-caught tuna.

The November 1, 1961, Bureau of Labor Statistics average price for the wholesale index on canned chunk style light meat tuna of $12.15 a case of 48 halves represented an increase of $1.15 (10 percent) from the August 1961 average. However, the price was still only 91.6 percent of the 1947-49 base price, while other selected canned fishery products were well over 100 percent of the base price.

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TWO ADDITIONAL CANNED PRODUCTS INTRODUCED:

A large California tuna canner announced on October 26, 1961, the introduction of 2 additional styles of pack for canned tuna. This is part of the canning company's program of expansion.

One variety is packed in corn oil, in place of the commonly-used soya oil. The other style of pack is without oil, and is packed in a clear vegetable broth.

U. S. Fishery Landings, January-August 1961

Total Landings: Landings of fish and shellfish in the United States during the first 8 months of 1961 were up about 358 million pounds, or 11 percent more than during the comparable period of 1960.

Salmon: On the basis of the reported pack of canned salmon, it was estimated that the Alaska catch for the year of about 262 million pounds was up 55 million pounds over a year ago.

Shrimp: The South Atlantic and Gulf States landings through August 1961 (88 million pounds) were down 45 million pounds--a drop of 34 percent from the same period in 1960.

Menhaden: Landings during the first 9 months of 1961 amounted to about 2,020 million pounds--an increase of 325 million pounds over the previous year. It appears that the 1961 catch of menhaden will exceed the record 1959 landings of 2,203 million pounds.

Heavy cement shucking bench in New Orleans oyster plant. Burlap bags of oysters on the bench ready for shucking. Shells are dropped through apertures in the bench top to the floor below.

United States Commercial Fishery Landings of Certain Species for Periods Shown, 1961 and 1960

Species	Period	1961 1/	1960	Total 1960
		.....(1,000 Lbs.).....		
Anchovies, Calif. 2/	8 mos.	4,100	2,198	3,304
Cod:				
Maine	7 mos.	1,700	2,265	2,897
Boston 3/	8 "	14,600	11,088	15,548
Gloucester 3/	8 "	1,800	2,216	3,199
Total cod		18,100	15,569	21,644
Crab, king, Alaska	8 mos.	32,000	20,400	28,570
Haddock:				
Maine	7 mos.	1,500	2,093	3,834
Boston 3/	8 "	59,200	54,600	76,695
Gloucester 3/	8 "	9,800	9,498	12,107
Total haddock		70,500	66,191	92,636
Halibut: 4/				
Alaska	8 mos.	23,200	19,294	21,351
Wash. & Oreg.	8 "	13,200	15,332	16,802
Total halibut		36,400	34,626	38,153
Herring:				
Maine	7 mos.	11,700	73,024	152,327
Alaska	to Sept. 9	38,700	50,278	77,913
Industrial Fish, Maine & Mass. 5/	8 mos.	35,500	30,915	43,733
Mackerel:				
Jack	8 mos.	33,600	43,630	74,945
Pacific	8 "	23,200	14,100	36,808
Menhaden	9 mos.	2,019,651	1,695,098	1,999,000
Ocean Perch:				
Maine	7 mos.	47,700	46,433	78,258
Boston	8 "	400	719	1,481
Gloucester	8 "	41,200	47,600	61,673
Total ocean perch		89,300	94,752	141,412
Salmon, Alaska	Year	262,500	207,101	207,101
Sardines, Calif.	thru Oct. 5	20,500	28,703	57,513
Scallops, Sea, New Bedford (meats)	8 mos.	14,200	13,008	19,353
Shrimp (heads-on), So. Atlantic & Gulf States	8 mos.	88,100	132,644	236,938
Squid, Calif. 2/	8 mos.	1,100	608	646
Tuna, Calif.	9 mos.	258,700	225,986	283,060
Whiting:				
Maine	7 mos.	9,000	7,615	11,123
Boston	8 "	70	161	754
Gloucester	8 "	36,400	40,340	63,112
Total whiting		45,470	48,116	74,989
Total all above items		3,103,321	2,796,945	3,590,045
Others not listed		449,479	397,708	1,339,955
Grand Total		3,552,800	3,194,653	4,930,000

1/Preliminary.
2/Cannery receipts.
3/Landed weight.
4/Dressed weight.
5/Excludes menhaden.
Note: Data for mollusks represent the weight of meats only. Data of other fish and shellfish represent weight as landed.

Tuna: Landings in California (including transshipments of United States-caught fish from South America) totaled almost 259 million pounds to September 30, 1961--up nearly 33 million pounds from the same period in 1960.

Haddock: The 8-months 1961 landings of 70.5 million pounds were about 4 million pounds greater than during the same period in 1960.

Halibut: The Alaska, Washington, and Oregon catch through August of 36 million pounds was 2 million pounds more than in the same period in 1960.

Scallops: New Bedford landings of meats during the first 8 months of 1961 of over 14 million pounds exceeded the 1960 catch for the period by over a million pounds.

Mackerel: Landings of Pacific mackerel (23 million pounds) through August 1961 were 9 million pounds more than those in the previous year, while jack mackerel landings (33.6 million pounds) declined 10 million pounds.

Whiting: During the first 8 months of 1961, landings at Gloucester (36 million pounds) were down 4 million pounds compared with the previous year.

U. S. Fishing Vessels

DOCUMENTS ISSUED AND CANCELLED, AUGUST 1961:

During August 1961, 41 vessels of 5 net tons and over were issued first documents as fishing craft, as compared with 50 in August 1960. The number issued first documents the first 8 months this year was 7 more than in the same period last year.

Table 2 - U. S. Fishing Vessels--Documents Issued and Cancelled, by Tonnage Groups, August 1961

Gross Tonnage	Issued 2/	Cancelled 3/
	(Number)	
5-9	6	6
10-19	14	8
20-29	2	1
30-39	7	3
40-49	2	1
50-59	1	1
60-69	2	1
70-79	3	3
80-89	1	-
100-109	-	2
230-239	1	-
480-489	1	-
810-819	1	-
Total	41	26

1/Includes both commercial and sport fishing craft. A vessel is defined as a craft of 5 net tons and over.
2/Includes redocumented vessels previously removed from records. Vessels issued first documents as fishing craft were built: 28 in 1961, 1 in 1956, 11 prior to 1951, and 1 unknown. Assigned to areas on the basis of their home ports.
3/Includes vessels reported lost, abandoned, forfeited, sold alien, etc.
Source: Monthly Supplement to Merchant Vessels of the United States, Bureau of Customs, U. S. Treasury Department.

Table 1 - U. S. Fishing Vessels 1/ --Documents Issued and Cancelled, by Areas, August 1961 with Comparisons

Area (home port)	August		Jan.-Aug.		Total
	1961	1960	1961	1960	1960
	(Number)				
Issued first documents 2/:					
New England	5	6	26	26	35
Middle Atlantic	4	2	9	15	18
Chesapeake	2	7	42	50	78
South Atlantic	5	6	31	42	47
Gulf	10	11	83	64	90
Pacific	13	14	136	123	146
Great Lakes	2	4	11	13	18
Puerto Rico	-	-	2	-	-
Total	41	50	340	333	432
Removed from documentation 3/:					
New England	2	2	13	17	22
Middle Atlantic	1	-	17	6	18
Chesapeake	5	3	25	13	21
South Atlantic	1	2	18	22	38
Gulf	10	4	70	68	90
Pacific	3	9	62	51	87
Great Lakes	4	1	15	7	13
Puerto Rico	-	-	-	1	1
Total	26	21	220	185	290

See footnotes in table 2.

U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, AUGUST 1961:

Imports of edible fresh, frozen, and processed fish and shellfish into the United States during August 1961 rose 3.6 percent in quantity and 7.9 percent in value as compared with July 1961. The increase was due primarily to greater imports of frozen albacore tuna (up 1.6 million pounds), frozen ocean perch fillets (up 1.2 million pounds), canned albacore tuna (up 1.5 million pounds), canned light meat tuna (up 1.1 million pounds), and fresh swordfish from Canada (up 1.8 million pounds). These gains were somewhat offset by a decline in the imports of all types of frozen fillets except ocean perch, frozen tuna other than albacore, canned salmon, and frozen and canned spiny lobsters.

Compared with August 1960, imports in August 1961 were down 10.0 percent in quantity, but up 4.7 percent in value. The increase in value was due to higher prices this year for nearly all imported fishery products. The drop in quantity came about because of a 12.9-million-pound drop in frozen tuna other than albacore and smaller declines in the imports of groundfish fillets (down 3.6 million pounds) and fresh and frozen salmon (down 1.0 million pounds). These declines were only partially offset by increases in fillets other than groundfish, canned white meat tuna, canned salmon, frozen spiny lobsters, and frozen scallops.

U. S. Imports and Exports of Edible Fishery Products, August 1961 with Comparisons

Item	Quantity			Value		
	August		Year	August		Year
	1961	1960	1960	1961	1960	1960
	(Millions of Lbs.)			(Millions of $)		
Imports:						
Fish & Shellfish: Fresh, frozen & processed 1/	88.2	98.0	1,011.2	28.8	27.5	304.8
Exports:						
Fish & Shellfish: Processed only 1/ (excluding fresh & frozen)	1.7	2.3	48.7	0.9	1.5	19.2

1/Includes pastes, sauces, clam chowder and juice, and other specialties.

United States exports of processed fish and shellfish in August 1961 were up 13.3 percent in quantity and 12.5 percent in value as compared with July 1961. Compared with the same month in 1960, the exports in August 1961 were down 26.1 percent in quantity and 40.0 percent in value. The lower exports in August 1961 were due to a drop in the exports of canned shrimp, salmon, and California sardines.

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UNITED STATES EXPORTS AND RE-EXPORTS OF FROZEN SHRIMP TO JAPAN, JANUARY-JULY 1961:

Of the almost 6.2 million pounds of domestic and foreign fresh and frozen shrimp exported and re-exported from the United States during the first seven months of 1961, almost 4.4 million pounds were shipped to Japan. A substantial proportion of the shipments to Japan was made from California. Most of the re-exports consisted of shrimp imported into the United States from Mexico.

U. S. Exports and Re-Exports of Fresh and Frozen Shrimp 1/ to Japan, Jan.-July 1961

Type of Product	July	Jan.-July
	(1,000 Lbs.)	
Domestic	1,211	1,657
Foreign	1,137	2,705
Total	2,348	4,362

1/Although data appear under the "fresh and frozen shrimp" category, it is believed that all of the exports were frozen shrimp.

Exports and re-exports of shrimp to Japan from California were negligible prior to 1961. But due to a short supply of shrimp in Japan during the first part of this year and a strong market, that country has purchased substantial quantities of shrimp from the United States. Most of the Japanese purchases consisted of frozen raw headless brown shrimp, 21-25 shrimp to the pound. But some shipments included 26-30 count, 16-20 count, and under 15 count.

* * * * *

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

The quantity of tuna canned in brine which may be imported into the United States during the calendar year 1961 at the 12½ percent rate of duty is 57,114,714 pounds (about 2,720,000 std. cases). Any imports in excess of the quota are dutiable at 25 percent ad valorem.

Imports from January 1-September 30, 1961, amounted to 40,664,702 pounds (about 1,936,500 std. cases), according to data compiled by the Bureau of Customs.

Imports in 1960 for the period January 1-October 1 amounted to 37,708,987 pounds (about 1,795,700 std. cases).

U. S. Production of Fish Sticks and Portions, July-September 1961

United States production of fish sticks during the third quarter of 1961 amounted to 15.7 million pounds and the production of fish portions totaled 14.6 million pounds. This was a gain of 11 percent in fish sticks and 21 percent in portions as compared with the same period of 1960. Most of the increase in fish sticks occurred in the cooked product (up 1.7 million pounds). The increase in portions was attributed to a greater production of raw breaded portions (up 2.2 million pounds).

Table 1 - U. S. Production of Fish Sticks by Months and Type, July-September 1961

Month	Cooked	Raw	Total
	(1,000 Lbs.)		
July	3,328	271	3,509
August	6,347	593	6,940
September	4,932	346	5,278
Total 3rd quarter 1961 1/	14,517	1,210	15,727
Total 3rd quarter 1960 2/	12,787	1,320	14,107
Total 1st 9 months 1961 1/	48,130	3,421	51,551
Total 1st 9 months 1960 2/	43,390	3,519	46,909

1/Preliminary data.
2/Revised.

Table 2 - U. S. Production of Fish Sticks by Areas, July-September 1961

Area	1961 1/		1960 2/	
	No. of Firms	1,000 Lbs.	No. of Firms	1,000 Lbs.
Atlantic Coast States	21	12,607	23	11,503
Inland and Gulf States	4	1,650	4	1,309
Pacific Coast States	9	1,470	8	1,295
Total	34	15,727	35	14,107

1/Preliminary data.
2/Revised.

Cooked fish sticks (14.7 million pounds) made up 92 percent of the fish stick total. The remaining 8 percent consisted of raw fish sticks. A total of 14.3 million pounds of breaded fish portions (of which 11.6 million pounds were raw) and 343,000 pounds of unbreaded portions was processed during the third quarter of 1961.

The Atlantic Coast led in the production of fish sticks and portions with a total of 21.3 million pounds. The remaining 9 million pounds of sticks and portions were from the inland, Gulf, and Pacific Coast states.

Table 3 - U. S. Production of Fish Sticks by Months, 1957-1961

Month	1961 1/	1960 2/	1959	1958	1957
	(1,000 Lbs.)				
January	6,066	5,504	6,277	5,471	4,261
February	7,059	6,535	6,352	5,925	5,246
March	7,178	7,837	5,604	5,526	5,147
April	5,605	4,864	4,717	4,855	4,492
May	5,084	3,700	4,407	4,229	3,380
June	4,832	4,362	4,583	4,702	3,522
July	3,509	3,684	3,790	4,574	3,821
August	6,940	5,006	3,879	4,358	4,643
September	5,278	5,417	5,353	5,328	4,861
October	-	6,554	5,842	5,485	5,162
November	-	6,274	4,831	5,091	4,579
December	-	5,322	4,743	5,467	4,014
Total	-	65,059	60,378	61,011	53,128

1/Preliminary data.
2/Revised.

Table 4 - U. S. Production of Fish Portions by Months, July-September 1961

Month	Breaded			Unbreaded	Total
	Cooked	Raw	Total		
	(1,000 Lbs.)				
July	702	3,146	3,848	84	3,932
August	586	4,244	4,830	102	4,932
September	1,366	4,260	5,626	157	5,783
Total 3rd quarter 1961 1/	2,654	11,650	14,304	343	14,647
Total 3rd quarter 1960 2/	2,036	9,440	11,476	583	12,059
Total 1st 9 months 1961 1/	7,614	33,175	40,789	1,246	42,035
Total 1st 9 months 1960 2/	5,421	27,352	32,773	1,410	34,183

1/Preliminary data.
2/Revised.

Table 5 - U. S. Production of Fish Portions by Areas, July-September 1961

Area	1961 1/		1960 2/	
	No. of Firms	1,000 Lbs.	No. of Firms	1,000 Lbs.
Atlantic Coast States	23	8,765	21	7,420
Inland and Gulf States	7	5,535	6	4,441
Pacific Coast States	7	347	4	198
Total	37	14,647	31	12,059

1/Preliminary data.
2/Revised.

Table 6 - U. S. Production of Fish Portions by Months, 1958-1961

Month	1961 1/	1960 2/	1959	1958
	(1,000 Lbs.)			
January	4,259	3,604	2,692	1,973
February	4,865	3,434	3,025	1,254
March	5,805	4,594	3,225	1,471
April	4,515	3,399	2,634	2,268
May	3,899	3,171	2,684	1,478
June	4,045	3,922	3,247	1,504
July	3,932	4,020	2,227	2,161
August	4,932	3,496	2,796	1,516
September	5,783	4,543	3,558	1,566
October	-	5,148	4,314	2,560
November	-	4,642	3,483	1,979
December	-	4,327	3,262	2,060
Total	-	48,300	37,147	21,790

1/Preliminary data.
2/Revised.

During the first 9 months of 1961, 51.6 million pounds of fish sticks were produced--an increase of 10 percent as compared with the same period of 1960. Fish portions (42 million pounds) were 23 percent greater than in the first 9 months of 1960.

Wholesale Prices, October 1961

There was a slight increase in prices of fishery products during October 1961, according to the wholesale price index for edible fishery products (fresh, frozen, and canned). The October index at 138.1 percent of the 1947-49 average was 1.2 percent higher than for September, and indicated a return to the trend of rising prices (prices had increased steadily from April through August 1961).

Prices for drawn, dressed, or whole finfish products were mixed. From September to October 1961, prices rose for fresh large haddock (ex-vessel price at Boston up 2 cents per pound, or 13 percent), fresh Lake Superior whitefish (wholesale price at Chicago up 31 percent), and fresh or frozen king salmon at New York City. But prices dropped for dressed western halibut (wholesale price at New York City down 11 percent) and fresh round yellow pike (wholesale price at New York City down 25 percent). The lower halibut prices in October were due to the use of

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, October 1961 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ ($)		Indexes (1947-49=100)			
			Oct. 1961	Sept. 1961	Oct. 1961	Sept. 1961	Aug. 1961	Oct. 1960
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					138.1	136.9	137.1	129.4
Fresh & Frozen Fishery Products:					153.0	151.4	153.5	143.7
Drawn, Dressed, or Whole Finfish:					152.5	150.0	162.4	166.4
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.11	.09	107.2	95.2	128.2	141.5
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.35	.39	107.3	120.7	117.6	94.4
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.85	.84	191.0	188.2	196.6	202.2
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.69	.53	171.1	130.2	158.7	183.5
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.45	.60	105.5	140.7	129.0	134.8
Processed, Fresh (Fish & Shellfish):					158.6	155.7	158.2	135.3
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.32	.31	108.9	105.5	103.8	103.8
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.87	.89	136.7	140.6	136.7	102.7
Oysters, shucked, standards	Norfolk	gal.	8.00	7.50	198.0	185.6	198.0	185.6
Processed, Frozen (Fish & Shellfish):					130.5	130.9	124.0	115.7
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.39	.39	100.8	100.8	100.8	102.1
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.33	.33	103.6	103.6	102.0	91.0
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.30	.30	120.8	120.8	114.8	112.8
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	.88	.89	135.8	136.6	125.8	114.2
Canned Fishery Products:					117.1	116.4	114.1	109.6
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	28.00	28.00	146.1	146.1	146.1	140.9
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.65	11.50	84.0	82.9	79.3	80.0
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 24 cans/cs.	Los Angeles	cs.	4.90	4.75	114.4	110.9	105.0	91.0
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	10.31	10.31	109.7	109.7	109.7	93.1

1/ Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

frozen fish because the season for fresh halibut ended in September.

Among the processed fresh fishery products, prices for shucked oysters (standards) at Norfolk rose 50 cents a gallon to the former high of $8.00. A lighter than expected supply in October along with an active demand brought the price back to about double the base period price.

Fresh and frozen shrimp prices dropped slightly from September to October 1961 at Chicago and New York City because of a short spurt in Gulf landings in late September. However, the available supplies in October were still only about one-half of a year earlier. Total shrimp (raw headless, breaded, peeled and deveined, and other types) cold-storage holdings on October 31, 1961, of 26.1 million pounds were 17.6 million pounds or 40 percent below a year earlier. A sharp drop in the October domestic shrimp production also contributed to the limited shrimp supplies. The shrimp supply situation, however, improved somewhat in October with an increase in the stocks of 5.4 million pounds from the end of September to the end of October because of increased imports of 2.3 million pounds from Mexico into Arizona and California.

A continued firming up of canned tuna prices was reported in October, with an average advance in mid-October of 15 cents per case over the September average. However, another sharp price increase for California canned tuna was announced on October 30 of up to $1.00 per case for most species and styles of pack. If the price remains steady at that level, the November 1961 average price will be $12.15 per case, or 50 cents above the October 15 average price.

The October 1961 California sardine fishery landings showed no improvement over the previous month. Due to limited supplies, California canned sardine prices in October again rose by 3 percent over September, or an increase of 9 percent over the August 1961 index.

With canned Maine sardine stocks in October at less than one-third of a year earlier, the wholesale price advanced by $2.00 a case or 19 percent during the last week of October 1961 which will make the November price $12.31 per case if no further increases take place.

Compared with a year earlier, the over-all index for edible fishery products in October 1961 was up 6.7 percent. A number of products in the index were priced substantially higher in October 1961 than a year earlier. Among these were frozen western halibut at New York City (up 13.6 percent), fresh shrimp at New York City (up 33.1 percent), and frozen shrimp at Chicago (up 18.9 percent). The canned fish subgroup index for October 1961 rose 6.8 percent as compared with October 1960. Most fresh fish items in the index were priced substantially lower, with fresh haddock at Boston down 24.2 percent because of heavier landings in October 1961.

LETHAL EFFECTS OF VISIBLE LIGHT ON FISH EGGS AND EMBRYOS

Experiments conducted at a New York State hatchery showed that an unusually heavy mortality (90 percent) of brook trout eggs in troughs was due to overhead 40-watt cool-white fluorescent bulbs. Reporting in the April 7 issue of Science, the author, Dr. Alfred Perlmutter, hypothesizes that visible light could kill the eggs and embryos of all aquatic animals.

He cites research on rainbow trout by Handorf (Physiologie, 1960) which indicates that violet and blue bands of white light are highly lethal. Green, yellow, and orange bands were progressively much less lethal. Greater resistance was shown by intensely colored yellow eggs than by paler eggs.

The author theorizes that if visible light is potentially lethal, all natural adaptations of egg and embryo tend to minimize the lethal effects, but do not give complete protection. The degree of mortality caused by exposure would vary with environmental changes. He concludes: "Years in which the spawning season extended over a period with clear, sunny weather comparatively free of wind and rain might result in unusually clear water, greater penetration of lethal visible light, and poor survival of the progeny of many aquatic forms. Year-class fluctuations in aquatic organisms have been attributed to changes in a wide variety of biological and physico-chemical conditions such as food, predation, disease, temperature, salinity, and currents. Yet frequently such fluctuations have shown either no relationship to, or a poor correlation with, these factors. It is suggested that in these instances visible light intensity might have been the unknown factor influencing year-class fluctuation."

FOREIGN

Principal Species of Commercial Shrimp in Argentina

By Enrique E. Boschi*

The main commercial species of shrimp caught in Argentine waters in the South Atlantic is Hymenopenaeus mulleri, Penaeidae family. This species is locally known as "langostino" and is pink in color.

It makes up the bulk of the crustaceans caught in Argentina. Marketed fresh, frozen, and canned, some of the frozen shrimp are exported to the United States.

The average yearly Argentine production from 1955 to 1960 was 2,327,704 pounds, heads-on.

Due to the magnitude of the fisheries for this shellfish, several Argentine institutions have initiated comprehensive studies of the species, some of the results of which have already been published (Anelescu and Boschi, 1959).

Fig. 1 - Shrimp fishing boats of Mar de Plata Port (Buenos Aires Province).

The first part of this investigation was conducted in the fishing area near the city of Mar del Plata, in the Province of Buenos Aires. This area was selected because it is the largest fishing port of the Republic and because of the facilities provided by the Marine Laboratory of the Department of Fisheries Investigations under the Secretary of Agriculture.

SAMPLING

Aproximately 3,000 specimens from the landings at the port were examined during 1954, 1955, and 1956. The specimens consisted of 15 lots corresponding to different months. Total length[1/] varied between 32 mm. and 176 mm., the majority being between the limits of 70 and 129 mm. (classes VII-XIII, table 1). According to the data, the females had a mean total of 106 mm. and the males 94.73 mm.

SEXUAL CYCLE

The observations made during the years of 1954 through 1956 show that maximum spawning activity occurs during the warm season of the year, corresponding in the Southern Hemisphere to the months of December, January, and February. It is during that time that most ripe females are found. Their ovaries have a greenish coloration. During the winter months

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1/Total length measured from the tip of rostrum to the tip of the telson.

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FISH AND WILDLIFE SERVICE
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Table 1 - Length Frequency and Percentage of Male and Female Specimens of Hymenopenaeus mulleri from Mar del Plata, February 1954 Through September 1956

Class No.	Classification at Intervals of 10 mm.	Male		Female		Male and Female	
		No.	%	No.	%	No.	%
IV	30-39	-	-	2	0.09	2	0.07
V	40-49	3	0.43	4	0.19	7	0.25
VI	50-59	14	2.03	17	0.83	31	1.13
VII	60-69	24	3.49	64	3.14	88	3.22
VIII	70-79	74	10.77	145	7.11	219	8.03
IX	80-89	143	20.81	272	13.34	415	15.22
X	90-99	186	27.07	341	16.73	527	19.33
XI	100-109	129	18.77	374	18.35	503	18.45
XII	110-119	72	10.48	311	15.26	383	10.45
XIII	120-129	29	4.22	223	10.94	252	9.24
XIV	130-139	9	1.31	134	6.57	143	5.24
XV	140-149	4	0.58	70	3.43	74	2.71
XVI	150-159	-	-	45	2.20	45	1.65
XVII	160-169	-	-	26	1.27	26	0.95
XVIII	170-179	-	-	10	0.49	10	0.36
Totals		687	99.96	2,038	99.94	2,725	99.90
Mean (X)		94.73±0.82		106.00±0.60		103.00±0.41	
Median		94.10±1.02		104.10±0.75		100.90±0.51	
Standard deviation (σ)		21.53±0.58		27.33±0.42		21.84±0.29	
Skewness (S_k)		+0.087		+0.130		+0.288	

some females are also found with fully developed gonads. The number of the winter spawners is much smaller than the summer spawners, but it indicates that this species has sexual activity during the entire year, with a peak during the summer months.

It is probable that the coastal waters of Mar del Plata are not a suitable area for spawning, and this function evidently takes place in deeper waters.

HYDROLOGICAL CHARACTERISTICS OF THE ENVIRONMENT

The water masses over the continental shelf of the fishing grounds off the Province of Buenos Aires have certain special characteristics due to the combined action of the waters of various origins that are mixed during the year. The water masses are made up of:

(1) Fresh water from the Rio de la Plata

(2) Waters from the cold drift of the Malvinas, bearing waters of sub-Antarctic origin. These waters prevail on the borders of the continental shelf. Their winter temperature is 6° to 8° C. (42.8°-46.4° F.) and their salinity between 33 and 34 parts per thousand.

(3) The warm waters of the Brazilian current which invade the oceanic area outside of the slope. The summer temperature of these waters is over 20° C. (68° F.) and their salinity 36 parts per thousand.

Fig. 2 - Stippled areas indicate principal shrimp fishing grounds along the coast of Argentina.

(4) Waters from upwelling originating in the deep layers of the slope. They appear in the vicinity of the shelf drop-off. Their temperature goes up to 6° C. (42.8° F.). Their salinity is high and they are rich in phosphates.

(5) In the coastal area, on the inside of the shelf, there is a "strip" of waters known as "residual" or "shelf waters." These waters are different from the bordering and slope waters because of their higher temperature and lower salinities. These have a movement back and forth along the coast during the various seasons of the year.

Summarizing the above information, one can say that the layer of waters at a depth of 20 meters (about 66 feet) that enclose the shrimp fishing grounds of Mar del Plata have a temperature of 9° C. to 20° C. (48.2-68.0° F.) and that the salinity varies between 33.27 and 34.94 parts per thousand.

FISHING

The fishing methods and gear common in the Mar del Plata area are the beam trawl and a smaller trawl. The fishing boats have an over-all length of 26 to 39 feet. The trawling is done in the sandy and muddy bottoms, generally at depths of 13 to 66 feet. Tows range from half an hour to one hour and a half. Fishing trips last one day, from very early in the morning until noon. The shrimp (heads-on) are stored in baskets and brought to port for cooking.

The greatest production in Argentina comes from the southern territory (Patagonia) near the city of Rawson. The second most productive area is near Bahia Blanca, in the Province of Buenos Aires (fig. 2).

A study of the shrimp from the Rawson area has been started.

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International

INTERNATIONAL PACIFIC HALIBUT COMMISSION

ALL REGULAR NORTH PACIFIC HALIBUT FISHING ENDED OCTOBER 1, 1961:

North Pacific regular halibut fishing in Areas 1A, 3B North, and 3B South ended at 6 a.m. (P.S.T.) on October 1, 1961. The areas mentioned were the only ones open for fishing after the closure of Areas 2 and 1B on September 7. Area 3B South includes the waters west of Area 3A, not including the Bering Sea. Area 3B North includes the waters in the Bering Sea. Area 1A includes waters south of Heceta Head, Oreg.

However, incidentally-caught halibut could be landed until 6 a.m. November 16, 1961. The rule is that halibut caught incidentally to fishing for food fish with set lines may be taken in the ratio of 1 pound of halibut to 7 pounds of other food fish. The November 16 deadline applied not to the catching of the halibut, but to landing and unloading.

The official opening date for all halibut fishing in the North Pacific regulatory areas this year was May 10 at 6:00 a.m. (P.S.T.), except that fishing in Areas 3B South started on April 25 and Area 3B North started on April 10.

Under the authority of the Convention between Canada and the United States for the Preservation of the Halibut Fishery of the Northern Pacific Ocean and Bering Sea, this year's regulations became effective on March 30, 1961.

INTERNATIONAL NORTH PACIFIC FISHERIES COMMISSION

JAPANESE PRESS COMMENTS ON MEETING OF COMMISSION:

The 8th annual meeting of the International North Pacific Fisheries Commission

International (Contd.):

(INPFC) was scheduled for November 6-11, 1961, in Tokyo.

The Japanese press reported that discussions at the meeting would be centered on two principal issues: (1) whether to move the present provisional abstention line (east of which the Japanese abstain from taking salmon) westward from its position at 175° W. longitude; and (2) whether the three member nations (United States, Canada, and Japan) are satisfied that the stocks of salmon and halibut and those stocks of herring off the Canadian coast are such as to continue to warrant abstention under the terms of the Convention. Japan in past meetings of the Commission has insisted on the exclusion of those stocks of fish under the terms of the Annex to the Convention.

Japanese press stories implied that the Japanese Government would oppose any plan submitted by the United States and Canada to shift the abstention line westward. Some also conjectured that the question of the Soviet Union becoming a member of the INPFC would be discussed by the Commission since some fishery circles were reported to hold the view that in order to achieve adequate conservation of the fishery resources of the North Pacific it would be necessary to include the Soviet Union as a Party to the Convention when the Treaty is revised in 1963, according to Japanese press reports.

The Working Party on High Seas Salmon Distribution of the Committee on Biology and Research of the INPFC met in Tokyo, October 1-20, 1961. Composed of one expert each from Canada, Japan and the United States, it was established by the Commission's Committee on Biology and Research to undertake preparation of joint reports on salmon research. (United States Embassy, Tokyo, October 13, 1961.)

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA

FORTY-NINTH STATUTORY MEETING:

The 49th statutory meeting of the International Council for the Exploration of the Sea was held in Copenhagen, Denmark, October 2-11, 1961.

The Council's main functions are to encourage investigations in marine science and to coordinate operations to this end by participating governments. Its area of operations may be roughly defined as the eastern North Atlantic Ocean and contiguous seas, including Greenlandic and Icelandic waters. The United States is not a member of the Council but is usually invited to send observers to the annual meetings. Three symposia, which began on September 25, were held in connection with the meeting. Two United States observers attended the meeting.

OCEANOGRAPHY

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION MEETS:

UNESCO's Intergovernmental Oceanographic Commission held an organizational meeting in Paris, October 19-27, 1961, according to a State Department spokesman. UNESCO, at its 11th session, adopted a resolution establishing the Intergovernmental Oceanographic Commission "to promote scientific investigations with a view to learning more about the nature and resources of the oceans through the concerted action of its members." It is planned for the Commission to meet annually and to "consider and recommend international programs for oceanographic investigation, review the results of scientific investigation and define the basic problems requiring international cooperation," and work for the exchange of oceanographic data on a world-wide basis.

UNESCO also established an Office of Oceanography to handle other activities in oceanography and act as a secretariat for the Intergovernmental Oceanographic Commission (IOC). IOC membership is open to all members of UNESCO, FAO, and other agencies of the United Nations. It is reported that more than 35 governments are expected to become members of IOC. In June 1961 a resolution of the International Commission for the Northwest Atlantic Fisheries urged that member-delegations be fully briefed on the oceanographic aspects of fisheries research, and to work for the establishment of an advisory fisheries committee to IOC.

Note: See Commercial Fisheries Review, May 1961 p. 39.

INTERNATIONAL ASSOCIATION OF FISH MEAL MANUFACTURERS

SECOND ANNUAL CONFERENCE:

At the invitation of the Portuguese Government, the Second Annual Conference of the International Association of Fish Meal Manufacturers was held in Lisbon, October 26-27, 1961. The Conference was preceded

International (Contd.):

on October 25 by meetings of the Executive Council and of the Scientific Subcommittee.

In addition to many Delegates from Metropolitan Portugal and Angola Portuguese Province, delegates and observers attended the Conference from the following member countries: France, Germany, Ireland, Netherlands, Norway, Peru, South Africa, Spain, Sweden, United Kingdom, and the United States. Delegates from Belgium and Morocco regretted their inability to attend. In addition, invited observers attended from Canada, Denmark, the Food and Agricultural Organization, and the Fishmeal Exporters Organization. During the Conference the Fishery Council of Canada was admitted to membership.

Apart from the usual business of an annual conference, among the matters discussed were means of increasing the consumption of fish meal and the better understanding of its value in less developed farming countries as well as in developed markets; the collection and dissemination of statistics in cooperation with FAO; and the practical and scientific assistance which the industry could give to FAO, WHO, and UNICEF in the development and utilization of fish in fish protein concentrate for human consumption in protein deficient countries. In particular, pilot-plant facilities and samples of fish meal for human consumption were offered to FAO to assist that organization and other international bodies in implementing plans discussed at the recent Fish in Nutrition Conference and Working Party in Washington, D. C.

Other scientific matters discussed were the continued effort further to improve the already high quality of this valuable protein food by expanding international studies, by improving methods of analysis, and by adopting the latest techniques of manufacture.

The principal objectives of the Association are the exchange and dissemination of scientific and technical information, examination and promotion of all matters of general interest to the industry, and representation internationally of the industry. The Conference provided a forum for discussion on scientific, manufacturing, and general trade problems. The Association was formed in October 1959.

Current problems which the Association is tackling, in some cases in conjunction with other organizations, include promotion activities and the advancement of scientific knowledge which will assist in the opening of wider markets for fish meal in both developed and underdeveloped markets and the greater utilization of fish meal in animal feeding, technical work and exploration of the requirements and demand for fish meal and fish flour for human consumption, standardization of analytical methods, and a wide range of technical and nutritional problems.

At the FAO Meeting on Fish Meal held in Rome in March 1961, the Association was entrusted with the task of collecting and disseminating certain monthly statistics, and apart from cooperating in preparing the program and agenda, played a prominent part in the proceedings.

Delegates and Observers attending the Conference included leading manufacturers and scientists in the industry. Manufacturers' associations in the following countries have now joined the Association: Angola, Belgium, France, Germany, Iceland, Mauretania, Morocco, Norway, the Netherlands, Peru, Spain, South Africa, and the United Kingdom. In addition, most leading individual manufacturers in the United States, which have no individual Association, and the principal manufacturer in Sweden are members. (United States Embassy, Copenhagen, October 9, 1961.)

ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT

OECD REPLACES ORGANIZATION FOR EUROPEAN ECONOMIC COOPERATION:

The Organization for Economic Cooperation and Development (OECD), which came into being September 30, 1961, supplants the Organization for European Economic Cooperation (OEEC) which was created in 1948.

The new designation reflects the changes that have taken place in the world economic situation since the former organization was created to administer the Marshall Plan aid and to restore the European economy on a cooperative basis. It also reflects the fact that two non-European countries--the United States and Canada--now have become full members, bringing the total to 20 countries, and that the organization will stress the need for major free world industrial nations to consult closely on their economic policies.

On October 16-18, 1961, the Fisheries Committee of the OECD met in Paris to con-

International (Contd.):

sider its work program for the coming year and review changes made during the past year in fishery policies of the member countries. The Committee discussed a draft program of work for the OECD in fishery matters; subsidies and other financial support to the fishing industries; the report on meeting of experts on the standardization of packaging material for fresh fish; and a progress report on technical actions on fishery matters.

Under the new organization, the Fisheries Committee has been elevated from a working party under the Agriculture Committee to a position with status equivalent to Agriculture.

UNITED STATES-CANADA ST. CROIX RIVER BASIN PROJECT INCLUDES RESTORATION OF ANADROMOUS FISH RUNS

The U. S. Department of State announced October 2, 1961, that the Government of the United States has considered the report of the International Joint Commission, United States and Canada, on the development of the water resources of the St. Croix River Basin, dated October 7, 1959, and has approved the recommendations contained in the report with the exception of one which is still under study. A similar approval of the Commission's report was announced by the Government of Canada. The project affects the Canadian Province of New Brunswick and the State of Maine in the United States.

The International Joint Commission was established pursuant to the Boundary Waters Treaty of 1909 to provide for the settlement of questions and to make recommendations concerning the use of boundary waters between the United States and Canada. The Governments of Canada and the United States, pursuant to Article IX of the Boundary Waters Treaty of 1909, on June 10, 1955 requested the International Joint Commission to investigate and report on the possibilities of further development of water resources of the St. Croix River Basin in Maine and New Brunswick.

To conduct the necessary investigations in the area, the Commission established the International St. Croix River Engineering Board with members from both countries. Interested parties were invited to present their views to the Commission at a public hearing in Calais, Maine, on June 27, 1958. As a result of its investigations and testimony at the public hearing, the Commission made a number of recommendations which were made public on November 10, 1959. These have been carefully studied by the Governments concerned.

The Governments have accepted the Commission's recommendations regarding steps to be taken to abate the pollution of the St. Croix River and recommendations that anadromous fish runs be restored.

FOOD AND AGRICULTURE ORGANIZATION

WORLD TUNA CONGRESS FOR 1962 PLANNED:

One of the impressive developments in world fishing during the past few years has been the increase of the catch of tunas and bonitos from about 500,000 tons in 1952 to more than 800,000 tons in 1959. But nobody yet knows the extent of the stocks of this group of fish, and even their migratory and spawning habits largely remain wrapped in mystery.

In the past the sea fishing industry has chiefly concentrated its activities on rich fishing grounds such as those found in the White Sea, off Iceland, off Newfoundland, and in various areas of the Continental Shelf of Europe, the Americas, Africa, and Asia, and it is only recently that fishermen have discovered that the tuna and related species roam in the hundreds of thousands, perhaps millions, over the temperate and tropical oceans of the world. So tuna fishing has become a major industry, nowhere more so than in Japan where the tuna fleets catch more than 500,000 metric tons of fish per year compared with little more than 200,000 tons in 1952. Even those figures do not reflect the full extent of Japanese enterprise in this booming industry as the Japanese tuna fishing boats are now operating in all the great oceans.

With the rapid development of the tuna fishing industry have come questions and problems of concern to all the nations engaged in the industry, many of them problems which can best be solved through international cooperation. In this connection the Food and Agriculture Organization (FAO), Rome, Italy, has taken the lead and is convening a World Scientific Meeting on the Biology of Tunas and Related Species, which will be held, at the invitation of the United States Government, in La Jolla, Calif. July 2-14, 1962.

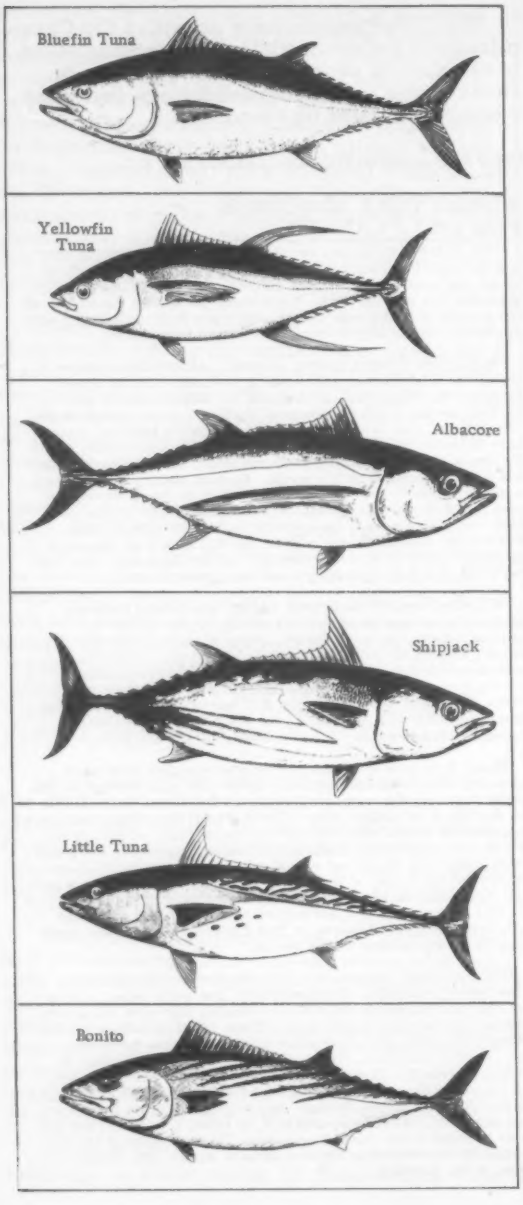
While it is true that tuna and related species have been fished by man from immemorial times (the tuna fishery in the Mediterranean, for example, is one of the oldest fisheries in the world), it is mainly since World War II that fishermen have realized the extent and commercial importance of this group of fish. For example, French, American, Japanese, and other fishermen have, in recent years, opened up a profitable tuna fishery off the coast of West Africa, while Norwegian and German fishermen have found they can catch tuna in the North Sea and in areas off the Norwegian coast. But the Japanese have been the great leaders in this fishery and they are operating in all the oceans of the world.

With this vast expansion of the tuna fishery there have come many problems. Commercially, the main types of tuna and related species are bluefin, yellowfin, big-eyed, albacore, skipjack, little tuna, and bonito. There is no agreement so far among biologists as to how many species of tuna there are. Two of the main types, the bluefin, which is found mostly in the North Atlantic, Mediterranean, and North Pacific waters, and the yellowfin, which is found mostly in the South Atlantic, the Pacific, and Indian Oceans, are among the most important commercially. Albacore, skipjack, bonitos, and little tuna are found in most of the oceans and seas. The question of identification of these various types will be a major item on the agenda of the meeting.

International (Contd.):

It is expected that a good deal of discussion will center around the need for reliable and standard statistics on catch and effort.

At present, for instance, only a few of the increasing number of countries engaged in tuna fishing keep statistics of catch and effort but with no agreed, uniform method so that the statistics are not comparable and much of their potential value is lost. "What is needed is an agreement among tuna fishing countries to standardize their methods of collection of statistics, which would be a big step towards assessing the magnitude of the world effort now going into tuna fishing and its effect on stocks."



Another big problem which concerns both biologists and fishermen is the migratory habits of this large and roaming species of fish. Nobody knows for certain, for example, whether the tuna which swim into the Mediterranean, presumably to spawn in the Aegean and Black Seas, form part of the vast tuna schools that migrate into the South Atlantic, down the west coast of Africa, and then across the ocean to the east coast of South and North America, or swim northward up the coast of Europe around the British Isles and over to North America.

In fact, we know very little about where tuna go in any of their seasonal movements. Attempts have been, and are being, made to track these migrations and there is some evidence to suggest from the catch of tagged fish that the bluefin tuna of the North Atlantic, for example, pass through the Mediterranean to spawn in the Aegean and Black Seas and then resume their thousands of miles of migration through the North and South Atlantic. But this is little more than hypothesis at present, supported only by the occasional catch of a tagged fish. For instance, two tuna which were tagged in 1954 by biologists of the Woods Hole Oceanographic Institute, Woods Hole, Mass., were caught five years later, in October 1959, by French tuna boats operating from the south of France. Similarly, tuna that had been tagged by biologists of the Inter-American Tropical Tuna Commission in California have been captured off the coast of Japan.

In view of the growing importance of the tuna fisheries, it is essential to know the full life story of tuna, the environment in which they live, the catch and effort of the fishing industry and an understanding of the dynamics of the population, if the stocks are to be exploited without depleting them.

The problems briefly mentioned, and many others, will be discussed by the World Congress. It is hoped that at the international meeting of fisheries scientists ways and means will be found to bring about effective international cooperation in investigating the riddle of the tunas so that ultimately we come to have sound knowledge of the magnitude of the resource and the effect that fisheries exert upon it.

Such knowledge is necessary if scientists are ever to be able to predict the volume which can be caught without impairing stocks. But that is looking far into the future and will, in any case, be a subject for discussion at the 1962 Congress.

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FORUM ON RESEARCH VESSELS HELD IN JAPAN:

The Research Vessel Forum convened in Japan by the Food and Agriculture Organization (FAO) opened September 18, 1961, in Tokyo. The purpose of the Forum was to provide information on all important technical aspects of the design and operation of research vessels, particularly those for fishery research, and to provide oceanographers, biologists, and naval architects an opportunity to exchange information and to discuss the work accomplished.

Discussions centered on "Jobs To Be Done." Oceanographers mentioned the increasing specialization in the various fields of oceanography. Considerable stress was laid on rapid changes in techniques used by physical and chemical oceanographers. Trends toward use of instruments which give multiple synoptic results through use of towed cables and special instruments were discussed. These methods of obtaining data require extensive hoisting devices with extremely sensitive controls.

New problems facing oceanographers created by radioactive waste were pointed out. Sampling of waters for trace elements requires large volumes of water. Weight

International (Contd.):

of water samples taken plus the need to keep them free of outside contamination requires innovations in deck equipment. Use of radioactive tracers or "tags" by both physical oceanographers and biologists were discussed. Problems of vessel and vessel laboratory contamination were stressed. Suggestions were made for minimizing radioactive contamination through use of paints with specified procedures for their use. In this connection, laboratory design and organization (vessel layout) were discussed.

Requirements by biologists for shipboard facilities for keeping organisms alive presents special problems in vessel plumbing. Normal piping (galvan, iron, etc.) is not satisfactory because of toxic effects on larval forms. Plastic pipes were recommended. It was noted that in some instances bottom (copper) paint could affect survival of organisms necessitating intakes for aquarium facilities to extend beyond the hull.

Projects to be conducted by exploratory fishing, experimental fishing, and gear research vessels were discussed and factors influencing ship design were noted. Members of the Forum boarded the Japanese research vessel Koyo Maru for a two-day trip at which time equipment aboard the vessel was demonstrated and a visit was made to the fishing port of Hedate.

Exchange of information took place on specific needs of research vessels including laboratory space, power (steam, Diesel, Diesel-electric, etc.), range requirements (fuel, etc.), winches required for scientific and fishing activities, and electronic devices.

UNITED NATIONS CONFERENCE
ON NEW SOURCES OF ENERGY

SOLAR DRYING DEVICES COULD SAVE MONEY IN FISHING AND FARMING:

Annual savings in the millions of dollars may be possible if effective, economical solar energy techniques could be applied in agriculture and fishing, the United Nations Conference on New Sources of Energy, which met in Rome, was told. A consulting chemical engineer of Denver, Colo., has suggested that these savings might be realized through lowering the costs of drying fish and various agricultural products; improving the quality of the products; and "reducing losses by spoilage, deterioration, transport delays, and other factors."

The comments were made in a discussion of the potentialities of solar energy for drying, cooking, and heat storage.

Some 500 scientists, engineers, technical experts, and government administrators from 70 countries attended the Conference, which opened on August 21-31, 1961. The participants considered practical ways of using energy from the sun, the wind, and the earth's underground heat, especially in less developed countries lacking conventional sources of energy for economic development.

In the discussion on solar energy, attention was drawn, among other things, to the widespread use of solar devices for drying grapes and fish, and to the contemplated application of solar drying of oil shale in Brazil to remove moisture from shale before oil extraction.

At least eight or ten improved types of solar cookers and ovens are available on the market, the Conference was informed, but costs of the units must be lowered before widespread use can be expected in the less developed countries. Local customs and traditions were considered to be "more serious obstacles" than technical problems in introducing solar cooking.

The Director of the National Physical Laboratory of Israel, said the prospects for increasing solar uses in food preservation were more favorable than those for air conditioning. The Director of the Kobayashi Institute of Physical Research of Japan said that solar water heaters were the most widespread direct use of solar energy. He spoke of a simple type of plastic heater developed in Japan.

Australia

FISHING VESSEL CHARTERED BY GOVERNMENT TO SURVEY TUNA RESOURCES:

The top vessel of the tuna fleet in New South Wales and South Australia, the M/V Estelle Star, has been chartered by the Australian Government to survey the commercial potential of tuna fishing off the southwest coast of Australia, the Minister for Primary Industry announced on August 3, 1961.

The survey was due to start in August and will last 12 months. The presence of tuna in the waters off the southwest coast of Australia has been clearly established, but little is known of the commercial prospects. The Commonwealth Government and the Western Australian Government are anxious to extend the tuna industry to the Western Australian area, the Minister of Primary Industry stated.

The Estelie Star, which was converted for tuna fishing two years ago, is 85 feet long, has a speed of 10 knots, and has refrigeration space for 42 tons of tuna. In the two years since it was converted to tuna fishing, the ves-

Australia (Contd.):

sel has taken about 20 percent of the total Australian catch each year. During the 1960/61 season the vessel caught 870 tons of tuna.

"The Estelle Star is therefore a proven tuna fishing vessel and has an experienced crew. It is well equipped for survey work," the Minister stated.

"If the survey proves successful, I hope that a prosperous tuna industry will be developed in Western Australia to help meet the growing demand for this fish. The Australian tuna catch has grown from 115 tons in 1951/52 to an estimated 5,000 tons last year. It is now the second largest fishery in Australian waters.

"However, owing to the growing popularity of canned tuna with the Australian public, local supplies have proved inadequate and tuna imports have increased rapidly in the past 12 months," he added.

At present the Australian tuna catch is taken about equally in New South Wales and South Australia.

The survey will be financed by the Fisheries Development Trust Account which was established by the Commonwealth Government in 1956 with funds received from the sale of the Australian Whaling Commission's station at Carnarvon. The western Australian Government and the Commonwealth research office will cooperate with the Fisheries Division of the Department of Primary Industry in the survey.

* * * * *

MODERN PILCHARD PURSE-SEINE GEAR INTRODUCED:

Pilchard purse-seine fishing using a modern nylon knotless seine and a power block has been developed in Australia during the past two years by the managing director of a fish cannery at Port Phillip.

For the purpose, a 68-foot fishing vessel (the M/V Surprise) was outfitted for purse-seining with a Japanese nylon net (150 fathoms long and 11 fathoms deep, equipped with plastic floats, nylon headline and footline, and a galvanized chain leadline).

The Australian Fisheries Division imported from the United States a power block, with a rope drive worked from the purse winch, and this was lent to operators of the Surprise to use with the large purse seine in order to make the purse-seine operation as efficient as possible.

The necessary canning equipment to can pilchards in flat cans has been installed at the Port Phillip cannery.

The five-man crew of the Surprise consists of experienced purse-seine fishermen who have worked in the Adriatic Sea and out of San Pedro, Calif.

After final preparations, including the fitting of a turntable in place of the existing platform on the vessel to facilitate the handling of the net, the purse-seine net was placed aboard the vessel early in March and a trial set was made off Port Arlington.

On the first set the efficiency of the operation was well demonstrated. The whole operation can now be carried out, at night, in a little over 30 minutes.

Most of the fishing to date has been at night, using mercury vapor lights on the vessel and also on an 18-ft. boat. Catches at first were small, but indications of possible commercial quantities appeared at the end of May when the vessel landed 5 short tons in a single haul. (Australian Fisheries Newsletter, July 1961.)

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COMMONWEALTH FISHERIES COUNCIL FORMED:

A conference of Commonwealth and State Ministers responsible for Australian fisheries, meeting at Canberra on September 1, 1961, decided to set up an Australian Fisheries Council.

The Chairman of the conference was the Minister for Primary Industry. He said the conference agreed the Fisheries Council would be established on the lines of the Australian Agricultural Council which has been functioning for more than a quarter of a century to consider and recommend on agricultural questions of mutual interest to the Comwealth and state governments.

The Fisheries Council will consist of the six State Ministers responsible for fisheries, the Minister for Primary Industry, who will be Chairman, the Minister in Charge of Commonwealth Scientific and Industrial Research Organization (C.S.I.R.O.), the Minister for Territories, and the Minister for Trade.

The functions of the Council will include:

1. Generally to promote the welfare and development of fishing industries.

2. To arrange the mutual exchange of information regarding fisheries production and marketing.

3. To cooperate to ensure the improvement of the quality of fisheries products, and the maintenance of high grade standards.

Australia (Contd.):

4. To cooperate to ensure uniform management policy.

5. To consider the requirements of fishing industries in regard to production and marketing.

6. To promote the adoption of a uniform policy on external marketing problems, particularly those pertaining to the negotiation of intra-Commonwealth and International Arrangements.

7. To consult on proposals for the grant of financial assistance to the fishing industries.

8. To consider matters submitted to the Council by the Standing Committee on Fisheries.

According to the Minister for Primary Industry, the conference decided that the first meeting of the Fisheries Council should be held within a year's time. Meeting of the Council will be held in each state and Canberra in rotation.

The conference of Ministers also decided to set up a Standing Committee on Fisheries consisting of the principal fisheries officers of the six states, the Commonwealth Director of Fisheries, the chief of the C.S.I.R.O. Division of Fisheries and Oceanography, and a representative of the Department of Territories, to advise the Council on the functions already outlined. The first meeting of the Standing Committee will take place within six months time.

Excerpts from a statement by the Minister of Primary Industry follow:

"The responsibilities of the States and the Commonwealth are clear in such matters as the management of fisheries in territorial and extra-territorial waters, but as fishermen operate from state ports and the fisheries overlap the respective state/Commonwealth boundaries of administration, the need for close cooperation among all Government authorities is self-evident.

"However, while such cooperation is most necessary, we should nevertheless accept our respective responsibilities in the different fields. These areas of responsiblility were first defined in 1947 and it may now be opportune to review the situation in the light of developments since then.

"It is highly important to cooperate in our efforts to protect and conserve our fisheries. Owing to the migratory habits of fish it is necessary that we examine each fishery carefully and introduce measures of management which will be to the mutual benefit of all concerned in the fishing industry--whether it be the fisherman, the processor or the consumer--regardless of the State in which they may live. Similarly continuing liaison between all the Governments represented here today is most important for the development of our fishing industries. A feature of the agenda we have before us is the number of items which require the close cooperation of us all.

"A basic problem is that the Australian catch has not kept pace with our increase in population. While Australian production has remained more or less stable, imports have increased considerably to meet consumer demand. The inability of Australian production to grow at a desirable rate may well be attributed to both biological and economic reasons which require the attention of Governments to encourage efficient and economic development in all sectors of the industry.

"Although production from some fisheries has increased, there has unfortunately been a significant fall in the quantity of fish taken in other sections of the industry and as a result the overall production has remained relatively stationary. The decline of certain fisheries, particularly the East Coast trawling industry, may be due partly to scarcity of fish and partly to economic reasons.

"Statistics show that the production of Tiger Flathead in New South Wales last year was 1,265,000 pounds, which is only 40 percent of the catch seven years ago. Similarly, the 1959/60 barracouta catch of 5,870,000 pounds was less than two thirds of the 1952/53 catch. There has also been a recent and serious fall in Australian salmon (trout) production. Last year the quantity landed was 7,600,000 pounds, as compared with 12,160,000 pounds only three years ago.

"The decline in these important fisheries points to the need for more research to pinpoint the factors affecting the catch and to suggest means of maintaining production at a reasonable level.

Australia (Contd.):

"In contrast to the decline in some of our own fisheries there has been a substantial increase over recent years in the volume of imported frozen filleted fish. This is somewhat disquieting. Much of this imported fish is coming from the United Kingdom, South Africa, and New Zealand. The value of these imports in 1959/60 was approximately £3¼ million (about US$7.3 million) compared with about £1½ million (about $3.4 million) in 1956/57. This development in itself emphasises the need to encourage the production of a good quality Australian pack which can be sold in competition and still be profitable to both fishermen and processors.

"Actually half of the total fish and fish products consumed in Australia is imported. The total value of imports of fish of all kinds was £6,145,000 ($13.7 million) in 1957/58 and £8,047,000 ($18 million) in 1959/60. On the other hand, fish exports from Australia which in 1957/58 were valued at £2,800,000 (about $6.3 million) had risen in value to £4,196,000 (about $9.4 million) in 1959/60. However, crayfish (spiny lobster) exports to the United States represented about 90 percent of the total.

"With regard to imports of fish, one of the problems we face is the direct Government assistance that is being given to fisheries overseas. This makes it possible for fish products to be landed in Australia at relatively low prices. The assistance varies from the subsidization of boat building, fishing operations, consumption and exports, to import restrictions. In the United States a part of the money raised by Customs duties on fish products is used for research and development, while a loan fund has been established to improve fishing fleets and to encourage more profitable operations.

"Though some of the forms of assistance used overseas may not be acceptable to Australian governments, the time has come when we should study more closely the methods which can best be used to improve our own fishing industry and so enable our fishermen to obtain a reasonable share of the domestic market.

"The Department of Primary Industry Fisheries Division has been studying developments in overseas fishing industries and according to the departmental reports it is significant that there is a general tendency abroad to spread activities over a wider area in search of new fishing grounds. Vessels are becoming larger and in some fisheries the trend is towards operations by factory ships and fleets of catcher boats with a mother ship. This development is transferring boat ownership from individuals to large companies. Advances have been made in vessel design and construction with an increasing use of fibre glass and plastics. Refrigeration facilities are improving and greater use is being made of electronic navigation and fishing aids.

"Recently we introduced into Australia a power block in an attempt to speed up purse-seine fishing operations. Tests on the pilchard fishery have been most successful and it is hoped that the block will be used for other fisheries with the same result.

"As part of the drive to expand Australian fisheries, the Fisheries Development Trust Fund, founded on the sale proceeds of the Whaling Commission's station at Carnarvon, was established.

"Generally speaking the money can be spent on developing fisheries in extra-territorial waters, whether the fisheries are confined solely to those waters or extend into territorial waters, as well as on technical, scientific and economic research into fisheries. Because of the constitutional limitation, direct financial assistance to the states from the fund itself cannot be given. The major expenditure to date has been on testing the commercial possibilities of trawling in the Great Australian Bight. The remaining expenditure has been mainly for surveys of different fishing areas, construction of a barracouta survey vessel, and crayfish biological research. Total expenditure to date amounts to £378,000 ($845,200).

"I would now like to say something on certain specific aspects of the industry which may be of general interest to Ministers.

"Crayfish: A feature of Australian fisheries is the commercial quantities of crayfish or spiny lobster taken off the coast from Port Macquarie to Shark Bay, and especially off the West Coast. The development of this industry is mainly due to the attractive United States market for frozen cray tails. The annual catch has increased considerably and estimated earnings have risen from $1,850,000 in 1950/51 to $8,400,000 in 1959/60.

Australia (Contd.):

"While we may be optimistic about the future of this industry, we must continue by careful management to safeguard it against depletion or over-exploitation which could adversely affect supplies and sales returns in the years to come.

"Tuna: The Australian tuna catch has shown a spectacular increase from 153 tons in 1950/51 to 5,000 tons in 1960/61. In volume it now ranks above all other Australian fisheries, except crayfish and mullet. Canned tuna has been readily accepted by the Australian public and the demand has grown at such a rate that, despite rising local production, imports are increasing.

"I hope it will be possible to raise our production so that we are not only self-supporting but are able to export substantial quantities of tuna in the round as well as in canned form. To do this we must aim at the development of this particular fishery not only in the existing areas but also in other States. As Ministers are probably aware, a survey of the tuna fishing potential was commenced recently in Western Australian waters in collaboration with the Western Australian Government and the C.S.I.R.O. I hope that not only will this survey lead to the successful establishment of a tuna industry in that State but also that it will encourage further development in other States as well.

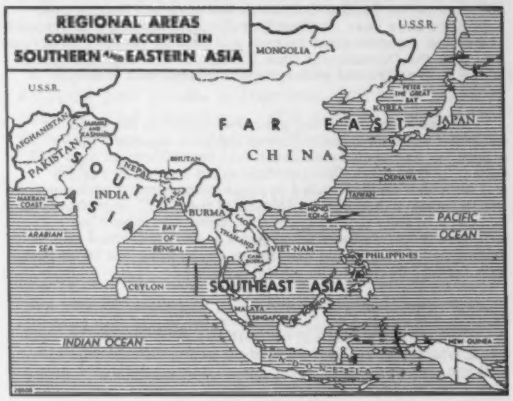
"Pearling: As a result of competition from the plastics industry the Australian pearling industry is going through a difficult period. Prices for the lower grade shell have been poor, due mainly to the loss of the shirt button trade. Fortunately, Australian pearl oysters are capable of producing the larger cultured pearls and it is expected that a portion of the pearling fleet will eventually be used to supply live shell for the pearl culture farms. There are significant developments in this direction and I understand that some 15 leases in all have been granted for this industry.

"Pearl culture is comparatively new in Australia, but it could eventually make a substantial contribution towards our overseas income and should be encouraged along sound and orderly lines. However, it may be necessary in the best interests of this industry to watch closely its rate of expansion in relation to the demand on world markets and also to maintain as much Australian capital as possible in it.

Burma

IMPORT DUTY RATES ON FISHERY PRODUCTS INCREASED:

The rates of duty for a number of imported commodities, including fishery products, were increased effective September 15, 1961, by a



governmental order issued under the Burma Customs Tariff Act of 1953. (United States Embassy, Rangoon, dispatch dated September 18, 1961.) The new and former rates of duty for fishery products follow:

Import Tariff Item No.	Name of Articles	Rate of Duty	Former Rate of Duty
7	Fish, dried or salted	50 pyas per viss	25 pyas
8	Fish, and fish products in airtight containers	75% ad valorem	40%
9	Prawns, dried	75 pyas per viss	50 pyas
11	Fish and fish products, not elsewhere specified, crustacea and molluses and preparations thereof	100% ad valorem	40%

Canada

NEW BRUNSWICK FISH MEAL PRICES, SEPTEMBER 1961:

Fish-meal prices (60-percent protein) quoted by New Brunswick producers late in September 1961 averaged C$120 a short ton ($2.00 a protein unit) for both exports and

Canada (Contd.):

domestic sales. There has been no change in this price since late July 1961. (United States Consulate, Saint John, N.B., September 28, 1961.)

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SYNTHETIC MONOFILAMENT GILL NETS BANNED IN BRITISH COLUMBIA SALMON FISHERY IN 1962:

The use of monofilament synthetic material in gill nets used in the British Columbia salmon fishery has been banned for one year by the Canadian Department of Fisheries. All sections of the British Columbia industry and fishing gear suppliers have been notified that the Department will prohibit use of the monofilament salmon gill nets in 1962. The action will give the Department time to make a thorough appraisal of the administrative problems associated with this type of gear.

The decision to ban the gear was taken on the basis of evidence secured mainly during the 1961 season's operations. It has been established that monofilament nets will, under certain conditions, outfish nylon and other regular gill nets to a degree where serious management problems would follow widespread adoption of the gear. Significant numbers of fishermen planned to convert to monifilament nets next year, and any advantages to the fishermen resulting from increasing efficiency would have had to be met with further restrictions on fishing time.

Some idea of the efficiency of the monofilament nets may be gained from this single report on the use of this gear in the Rivers Inlet sockeye fishery in the 1961 season. In one week, when the average catch of all gill-net boats was 410 sockeye, two fishermen using complete monofilament nets took 1,100 and 1,546 sockeye each.

In another case, a fisherman who used a 50-fathom monofilament panel in his regular nylon net found it fished two or three times better than the remainder of the net.

The monofilament gill net first appeared in the British Columbia fisheries in 1959, when a few fishermen used sections of monofilament webbing in their nylon or linen nets. The new gear had been introduced in the State of Washington fishery the previous year and, in 1960, that State prohibited its use in the salmon fisheries.

The Department of Fisheries of Canada kept a close watch on the monofilament gill nets in 1960, but the generally low catches did not produce conclusive evidence that the gear posed a threat to salmon stocks greater than that of other gear. The decision to ban the monofilament gill net was a most difficult one for the Department. In view of the problems widespread use of the gear would create in management of the salmon resource, however, there was no immediate alternative. For the time being, the ban on the use of the monofilament gill net applies to the calendar year 1962 only. (Canadian Trade News, August 1961.)

Curacao

JAPANESE FISH CANNERY PLANNED FOR FREE ZONE:

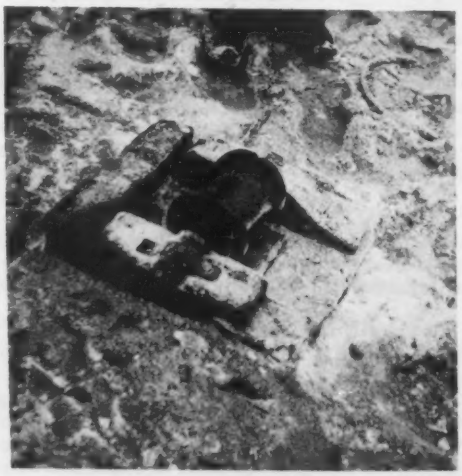
A large Japanese fishery company has formed a subsidiary in Curacao for the purpose of establishing a fish cannery in the Free Zone.

The Japanese subsidiary has an authorized capital of US$1,140,000 and a paid in capital of $134,000. As inducements to set up an industry in Curacao, the firm has been granted a 10-year tax holiday and a 10-year monopoly on the processing and canning of fish. The monopoly is believed to be attractive to the Japanese firm because it protects their labor supply from the potential competition of any processor who may enter the same business in Curacao at a later date. (United States Consulate General, Curacao, Sept. 8, 1961.)

Denmark

FISHERY TRENDS, JANUARY-AUGUST 1961:

A sharp upturn in the Danish fish catch during the summer months raised the total catch for the first 8 months of 1961 to 5 percent above a year earlier. The valuable flatfish catch was up about 25 percent and the herring catch almost 20 percent. As a result, exports of fresh, iced, or frozen fish were about 33 percent ahead of 1960 by weight and about 25 percent ahead by value. While fish meal exports showed comparable percentage gains over the low 1960 level, they remained far below earlier years.



Portable roller for beaching smaller Danish fishing boats.

Denmark (Contd.):

The size of the catch caused a further decline in domestic prices for consumer fish, with attendant grumbling from fishermen over this development and over continued low prices for industrial fish. Partly because of price developments and partly as a result of subsidies granted the farmers, some Danish fishermen were demanding export price guarantees and/or domestic subsidies. Much concern continued to be expressed over the difficulty of recruiting sufficient labor to man the fishing fleet.

Another problem of vital concern to Denmark's fisheries is accession to the European Economic Community (EEC). With important markets in the EEC countries, Danish fishery circles are almost unanimous in favoring accession, although some concern is expressed over the eventual effect of EEC membership on fishing rights. (United States Embassy, Copenhagen, October 16, 1961.)

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FISH FILLETS AND BLOCKS AND FISHERY BYPRODUCTS EXPORTS, JANUARY-AUGUST 1961:

Denmark exported 5.8 million pounds of fresh and frozen fish fillets and blocks during August 1961--only 195,000 pounds more than in August 1960. The United States received only 283,000 pounds, mostly cod and related species.

From January through August 1961, Denmark shipped 9.1 million pounds of frozen fish fillets and blocks to the United States, again mostly cod and related species.

Total exports of fresh and frozen fillets and blocks January-August 1961 amounted to 46.9 million pounds, an increase of 14.2 million pounds over the same period in 1960. Exports of fillets and blocks of cod and related species increased by 27.7 percent, and flounder and sole exports were up 22.0 percent.

Denmark's Exports of Fresh and Frozen Fish Fillets and Blocks and Fishery Byproducts, January-August 1961 1/

Product	August		Jan.-Aug.	
	1961	1960	1961	1960
Edible Products:	..... (1,000 Lbs.)			
Fillets and blocks:				
Cod and related species	1,597	1,402	24,396	19,014
Flounder and sole	2,761	3,185	15,612	12,794
Herring	1,421	-	5,988	-
Other	59	2/ 9	887	2/924
Total	5,838	4,596	46,883	32,732
Industrial Products:	.....(Short Tons).....			
Fish meal, solubles, & similar products	6,750	5,922	33,534	27,618

1/Shipments from the Faroe Islands and Greenland direct to foreign countries not included.
2/Includes herring fillets.

Denmark's exports of fish meal, fish solubles, and other similar products rose from 5,922 short tons in August 1960 to 6,750 tons in August 1961. But exports of industrial fishery products for the first eight months of 1961 were 21.4 percent greater than those of the same period in 1960.

Ecuador

IMPORT DUTY ON FISH NETS AND TWINE LOWERED:

Ecuador has lowered the specific import duty on fishing nets made of synthetic fiber and on twisted cotton thread.

Tariff items affected, their new duties in sucres per gross kilogram, percent ad valorem, and previous rate, are as follows (18.18 sucres = US$1, official rate):

487. Netted fabric: (a) Fishing nets made of synthetic fiber, 10 sucres a kilo (55 U. S. cents a kilo or about 25 cents a pound) plus 10 percent ad valorem; former rate 120 sucres a kilo ($6.60 a kilo or about $3.00 a pound) plus 10 percent ad valorem; new subitem. (b) Other items unchanged from former rate, new subitem.

524. Twisted cotton thread, 10 sucres a kilo plus 10 percent ad valorem; former rate, 17 sucres a kilo (93.5 cents a kilo or about 42.4 cents a pound).

The reductions, set forth in Decree No. 1411, were published in Registro Oficial of August 19, 1961, and became effective on that date.

Fiji Islands

TUNA FISHING BASE PLANNED:

According to recent Japanese press reports, a plan to establish a fishing base in the Fiji Islands appears to have created much interest within the Japanese fishing industry. This plan was developed by a member of the Japanese Diet, who visited the Fiji Islands in June 1961 with fellow members to investigate possible localities for constructing fishing bases. He returned to the Fiji Islands in Sep-

Fiji Islands (Contd.):

tember to further his plan, which is reported to be of such an unprecedented character that existing Japanese policies concerning the establishment of overseas bases do not cover such conditions, and basic policy changes may need to be made to fit such situations. Also, the plan if carried out, would affect the future development of the fishing industry. Accordingly, the Japanese Fishery Agency Director has instructed the responsible section within his Agency to carefully study the plan.

In essence the plan proposes to:

1. Establish a joint company at Levuka, Fiji Islands, with each national party to the venture to contribute the equivalent of 50 percent, or 250 million yen (US$694,400).

2. Construct a freezing plant with a daily freezing capacity of 40 metric tons and an ice-producing plant of 40-ton capacity. These plants would be constructed by a Japanese firm.

3. Construct a two-line cannery with a daily production capacity of 500 cases. This plant would be constructed by a Japanese can company.

4. Construct a fish meal and oil plant.

5. Construct a machine shop, wireless station, residences, supply, and recreational facilities.

Initially, the joint company would be operated by the joint company but management would eventually be turned over to a fishermen's cooperative. The cooperative, to be called the South Pacific Ocean Tuna Fishing Cooperative, is to be established immediately in Japan, and would negotiate a contract to deliver catches to the joint company. Under a five-year plan, the cooperative would dispatch 100 fishing vessels, each of 65 tons gross, to fish for this base, and of this number 20 vessels would be constructed in the first year. Vessel license restrictions would be waived, as the fishermen would be emigrating to the Fiji Islands. In addition, 40 technicians would be sent to manage the base and 200 or so natives hired as help. (Suisan Tsushin, September 14 and Suisan Keizai Shimbun, September 2, 1961.)

A New Zealand Press Association report of October 5, 1961, appearing in the Auckland Herald and the Wellington Dominion, states that Japanese tuna vessels will work from Fiji during the next tuna season in New Zealand waters.

It reports that according to a Suva, Fiji Island, solicitor, a Japanese-controlled company with a nominal capital of £250,000 ($694,400) had been formed in Fiji and that work had begun on establishing a cannery and base for fishing boats at Levuka. The report goes on to state that the company in Fiji was first launched by seven citizens from Suva. A New Zealand firm was requested to submit a plan for the construction of a cannery. The controlling shares were purchased by Japanese interests and fishing experts from Japan were immediately sent to Fiji to establish the industry.

In an interview with a Fiji newspaper, the Suva solicitor said local and export markets would be investigated. "We intend to export to Hawaii, the United States, Europe, and Japan," he said. "If there are markets in New Zealand and Australia, we will export to those countries too," said the solicitor. "The fishing boats will be Japanese manned and the experts in the venture will be Japanese." (U. S. Embassy, Wellington, October 16, 1961.)

German Federal Republic

FISH MEAL PRICES, OCTOBER 6, 1961:

Type of Fish Meal	Protein Content (%)	Delivery	DM/Metric Ton 1/	US$/Short Ton
German	50-55	loco/ prompt 2/	550.00	124.74
"	55-60	" " 2/	560.00	127.01
"	60-65	" " 2/	575.00	130.41
" std. brands	60-65	Oct. 1961	618.50	140.28
" herring	64-68	prompt/Oct. 1961 3/	640.00	145.15
Peruvian	65-70	prompt/Dec. 1961	535.00	121.34
"	65-70	Jan.-July 1962	525.00	119.07
Angola	65-70	loco/Oct. 1961 2/	597.50	135.52
Portuguese	50-55	prompt/Oct. 1961	547.50	124.18
Icelandic herring	70-75	loco/Oct. 1961 2/	677.50	153.66
South African	65-70	Nov.-Dec. 1961	585.00	132.68
" "	65-70	Jan.-Apr. 1962	565.00	128.14

1/Values converted at rate of 4.0 deutsche marks equal US$1.
2/"Loco" means where and as it is at the time of sale, and all subsequent expenses to be at buyer's account.
3/Delivered coastal location.

German Federal Republic (Contd.):

Prices reported at Hamburg Commodity Exchange as of October 6, 1961, for fish meal delivered ex-Hamburg warehouse, or c.& f. West German sea port are shown in the table on the preceding page.

As compared with September 4, 1961, fish-meal prices on the Hamburg exchange on October 6, 1961, were mixed, with both domestic and imported fish meal somewhat lower on the average. (United States Consulate, Bremen, October 12, 1961.)

Guatemala

JOINT JAPANESE-GUATEMALA SHRIMP BASE STARTS OPERATIONS:

The new fish processing installations and seven fishing vessels (belonging to two Guatemalan fishing companies) were blessed and inaugurated at the Pacific coast port of Champerico, Guatemala. President Ydigoras, as well as several of his Cabinet Ministers, prominent figures in the Guatemalan banking and business world, and a large delegation of Japanese businessmen attended the ceremonies.

The two companies have been reorganized recently with the introduction of Japanese capital representing 42 percent of the total investment, which has been declared at more than Q.1,500,000 (US$1.5 million). Two Japanese companies are participating in this venture. A Japanese engineer is said to be a technical director for the fishing and processing operations. The six fishing vessels (each of 30 gross tons) and one tow boat are captained by Japanese and a substantial percentage of the crew members are also Japanese to provide training for the Guatemalans. The fishing vessels (built in Mexico) are reported to have a capacity in their freezing compartments for 12,000 pounds of fish, permitting them to remain at sea for seven days before returning to port. Besides the 6 fishing vessels, 14 local vessels are to be chartered, making a total of 20 shrimp vessels fishing for the joint company. Vessels which were formerly leased by one of the two Guatemalan companies from Panama were reported to have been returned to their owners.

At the present time the main activity of the joint operation centers around the catching, processing, freezing, and exportation of shrimp. The management said they hope to sell to the restaurant trade in the United States by providing quick service by air, but the bulk of the catch will be shipped by sea to United States ports to be sold to supermarkets and other retail outlets.

The price of shrimp is too high to find a large domestic market, sales generally being restricted to the more wealthy consumer. The consumption of fish products has traditionally been low in Guatemala. Therefore, as it was explained by members of the Japanese delegation, the companies plan to introduce a low-priced fish-meal sausage, which could be purchased by the poorest consumer, thus increasing the protein diet of these classes and creating a market for seafood other than shrimp.

President Ydigoras has given strong backing to the creation of a local fishing industry, as exemplified in the recently enacted law on deep-sea fishing, which gives preferential treatment to fishing companies incorporated in Guatemala and which register their vessels in Guatemala. The two Guatemalan companies involved in the venture with the Japanese have followed the procedures prescribed by the law and seem to have the President's blessing.

In addition, a cold-storage plant with a freezing capacity of 12.5 tons and holding capacity of 20 tons; and an ice plant of 15-ton capacity, are under construction and scheduled for early completion.

Iceland

SHRIMP INDUSTRY:

Iceland's export value for shrimp products as of October 1961 was about 25 million kronur (US$656,000) a year. The export value of shrimp for the first six months of 1961 was 18 million kronur ($472,000). The weight of the shrimp exported the first six months of 1961 was 25 percent more than in the same period in 1960. The expansion of the shrimp industry depends on finding new shrimp grounds. During a month-long search for shrimp fishing grounds carried out in the summer of 1961 on the north and east coasts, shrimp was found in 56 of the 87 locations explored. (United States Embassy, Reykjavik, report dated October 12, 1961.)

Note: Values converted to dollars at rate of 38.10 kronur equal US$1.

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Iceland (Contd.):

FISHERY LANDINGS, JANUARY-JUNE 1961:

How Utilized	January-June	
	1961	1960
	. . (Metric Tons) . .	
Herring[1]/ for:		
Oil and meal	28,657	38,430
Freezing	8,004	398
Salting	17,609	259
Fresh on ice	4,119	645
Groundfish[2]/ for:		
Fresh on ice landed abroad	15,539	11,500
Freezing and filleting	87,908	129,001
Salting	55,458	59,229
Stockfish	41,083	50,381
Home consumption	3,997	4,426
Oil and meal	1,717	2,360
Shellfish for:		
Freezing	3/1,105	-
Canning (shrimp)	126	-
Total production	265,322	296,629

1/Whole fish.
2/Drawn fish.
3/Shrimp 801 tons; lobster 304 tons.

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ICELANDIC PRODUCTION OF PROCESSED FISHERY PRODUCTS AND BYPRODUCTS, JANUARY-JUNE 1961:

Product	Quantity	Value	
	1,000 Metric Tons	Million Kronur	US$ 1,000
Frozen			
Fillets	27.7	409.4	10,774
Fish waste	8.0	12.6	332
Herring	8.1	42.8	1,126
Fish roe	0.7	8.6	226
Shrimp and lobster	0.1	9.0	237
Total Frozen	44.6	482.4	12,695
Cured			
Salt fish, wet	25.0	226.1	5,950
Stockfish	7.0	158.9	4,182
Herring	12.4	92.5	2,434
Fish roe	0.2	1.8	47
Other	0.9	6.7	176
Total Cured	45.5	486.0	12,789
Canned			
Shrimp	1/	2.7	71
Byproducts			
Meal:			
Herring	6.8	31.8	837
Ocean perch	2.0	7.1	187
Lobster	0.1	0.1	2
Liver	0.2	1.1	29
Other	14.1	53.3	1,403
Oil	7.8	42.2	1,111
Solubles (50% solids)	0.6	0.9	23
Total Byproducts	31.6	136.5	3,592
Miscellaneous			
Fish skins	0.1	0.4	10
Whale products	1.6	9.8	258
Total Misc.	1.7	10.2	268
Grand Total	123.4	1,117.8	29,415
Fish landed abroad	19.7	75.7	1,992
Home consumption	8.5	22.5	592

1/Includes 40 tons of shrimp.
Note: Values converted at rate of 38 kronur equals US$1.00.

India

FISHERIES MANAGEMENT INSTITUTE:

Plans for a Fisheries Management Institute are being implemented by the Government of India and the Food and Agriculture Organization (FAO). Financial support will be given by the United Nations Special Fund and the Government. The Institute will be jointly administered by FAO and the Government.

The Institute will be situated in Bombay, and will be housed in a new building, to be erected in the near future. FAO desires that each state in India be represented on the Board of Directors. FAO will also encourage eventual development of the Institute on an international basis.

The Institute will provide three years of training for carefully selected students, and their training will include management of fisheries, marine biology, and associated sciences. Eight students have already been accepted and a total enrollment of 40 to 50 students is expected. (United States Embassy, New Delhi, August 21, 1961.)

Ivory Coast

FISHING INDUSTRY EXPANDS:

The fisheries of the Ivory Coast have grown steadily since 1954. By 1961, Abidjan had 60 fishing vessels, 3 boatyards, and 2 ice plants.

Ivory Coast (Contd.):

The 2 ice plants have a total daily capacity of 150 tons.

In 1960, two-thirds of the Ivory Coast catch of 29,000 tons was smoked. Fresh fish without ice is marketed within a 30-mile radius of Abidjan. Fresh fish on ice is shipped in refrigerated trucks at night and reaches interior towns within 250 miles of Abidjan and Koumassi, Ghana.

The distribution of frozen fish is limited to the centers with cold-storage plants--Bouake, Dimbokro, Divo, and Gagnoa. Smoke-dried fish reaches all the centers of the interior. (L'Industriel de Cote D'Ivoire, Bulletin No. 37, June 1961.)

Japan

NEW CANNED TUNA PRODUCTS SALES SMALLER THAN ANTICIPATED:

A large Japanese fishing company which introduced three new canned tuna products--curried tuna, vegetable tuna, and sandwich tuna--in Japan in June 1961, is reported to have sold about 60,000 cases of those products as of September 1961. Sales are reported much lower than anticipated and they feel that it may take some time before the products gain acceptance with the general public.

However, sales, which averaged about 20,000 cases a month, are considered fairly good when compared with the sale of canned "tender tuna" introduced by another fishing firm in July 1960. That company's sales averaged slightly under 17,000 cases a month, or about 250,000 cases for 15 months, ending in September 1961. The "tender tuna" consist of four types of pack: tuna in soy sauce, tomato sauce, stew, and curry.

The fish firm hopes to promote curried tuna, vegetable tuna, and sandwich tuna so as to eventually sell about 500,000 cases a year in Japan. However, sales for the first year are expected to total only about 150,000 cases. (Suisan Tsushin, September 27, 1961.)

Translator's Note: Canned curried tuna consists of tuna and curry sauce. Vegetable tuna is made of tuna, tomato sauce, and potatoes. Canned sandwich tuna is a sandwich spread.

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PACK OF CANNED TUNA IN BRINE BY CAN SIZES, 1960:

During the calendar year 1960, the Japanese pack of canned tuna (light and white meat) in brine totaled 2,042,388 actual cases.

Japanese Canned Tuna Pack in Brine by Can Sizes, 1960

Can Size & No of Cans/Cs.	Solid Pack	Flakes and Grated	Total
	(Actual Cases)		
7-oz., 48	1,024,551	61,163	1,085,714
13-oz., 24	394,744	-	394,744
13-oz., 48	365	-	365
66-oz., 6	534,483	1,060	535,543
3½-oz., 48	8,778	-	8,778
Odd sizes	949	16,295	17,244
Total (actual cs.)	1,963,870	78,518	2,042,388
Total (std. cs. 1/)	2,023,647	93,042	2,116,689

1/A standard case is 48 7-oz. cans or the equivalent.

By can size, the 7-oz. 48 cans-per-case pack accounted for 1,085,714 cases, or 53 percent of the total brine pack. The institutional can size (66 oz., 6 cans per case) accounted for 535,543 cases, or 26 percent of the total. Most of the brine pack was solid, accounting for 96 percent of the total, with the balance in flakes and grated. (See table.)

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FROZEN TUNA EXPORTS TO UNITED STATES, APRIL-SEPTEMBER 1961:

Frozen albacore and yellowfin exports to the United States from Japan proper, April 1 to September 30, 1961, declined, while transshipments to the United States of those species increased, according to data compiled by the Japan Frozen Foods Exporters Association (table 1).

Table 1 -Japanese Frozen Tuna Exports to U. S., April-September 1961 and 1960

Species	1961			1960		
	Japan Proper	Transshipments	Total	Japan Proper	Transshipments	Total
	(Short Tons)					
Albacore	6,521	3,649	10,170	8,176	1,645	9,821
Yellowfin	15,484	8,961	24,445	17,704	8,275	25,979
Big-eyed	433	-	433	68	-	68
Skipjack	197	-	197	70	-	70
Loins	1,883	-	1,883	1,682	-	1,682
Total	24,518	12,610	37,128	27,700	9,920	37,620

Note: Japanese fiscal year begins on April 1.

Exports of frozen tuna to Italy totaled 13,620 metric tons and to Yugoslavia 4,137 tons, between April 1 and September 30, 1961. Exports to those two countries for the same period in 1960 totaled 12,272 tons and 4,805 tons, respectively. (Suisan Tsushin, October 5 & 7, 1961.)

Translator's Note: On the basis of the values for the above exports, albacore exports to the United States from Japan

Japan (Contd.):

proper sold for an average of $328 a short ton between April-September 1961 and $294 a ton for the same period in 1960; frozen yellowfin sold for an average of $281 a short ton between April-September 1961 and $253 a short ton for the same period in 1960, all f.o.b. Japan.

According to earlier press reports, Japan established an export quota to the United States of 95,000 short tons of frozen tuna (see table 2).

Table 2 - Comparison of Japanese Frozen Tuna Quota and Exports to United States for Fiscal Year 1961

	Quota Target April 1, 1961-March 31, 1962	Exports 1/ Apr.-Sept. 1961 (Six Months)	Percentage of Quota Exported
	.....(Short Tons).....		%
Albacore:			
Japan proper	30,000	6,521	22
Transshipments ...	5,000	3,649	73
Yellowfin:			
Japan proper	30,000	15,484	52
Transshipments ...	30,000	8,961	30
Tuna Loins:			
Japan proper	3,600	1,883	52
Total	98,600	36,498	37

1/Does not include big-eyed and skipjack exports.

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FROZEN TUNA SHIPMENTS, APRIL-SEPTEMBER 1961:

According to the Japanese tuna freezers association, total shipments of frozen tuna during the first half of the Japanese fiscal year 1961 (April-September) amounted to some 67,000 metric tons, almost the same as the previous year during the same period. Of the total, 23,900 short tons of Atlantic tuna went to Europe and Africa, 27,500 short tons were directly shipped from Japan to the United States and Canada, and 12,000 short tons were transshipped to the United States and others. (Note: Destination of the balance was not shown.)

Compared with the corresponding period the previous year, shipments (23,900 short tons) of Atlantic tuna to Europe and Africa were up 9 percent. To Italy, the principal market, 16,400 short tons (17,200 tons the previous year) were shipped, a decrease of 4 percent. But there were greater increases in shipments to Yugoslavia and other European and African areas. To Yugoslavia, shipments of 4,900 short tons (3,000 tons the previous year) were up 61 percent. To other European and African areas, shipments of 2,600 short tons (1,000 tons the previous year) were up 49 percent. During May and June 1961, fishing for Atlantic tuna was poor and scheduled June and July shipments were delayed one to two months. Beginning the latter part of July, fishing conditions improved and recovered to the same level as those prevailing the previous year.

Shipments during the first half of the fiscal year were up because of good catches of big-eyed. But yellowfin catches were poor. In August 1961, the 20-percent big-eyed limit (in effect since the previous fiscal year) was removed for mixed shipments. As a result, big-eyed made up for the shortage of yellowfin in the catches. However, the value of the 1961 fiscal year's shipments was expected to be less than the previous year because the price on any portion of big-eyed in excess of 20 percent of any shipment was reduced by $15 a short ton. Czechoslovakia and Spain bought frozen tuna from Atlantic Japanese tuna vessels for the first time and were responsible for some of the increase in shipments in fiscal year 1960.

The 12,000 short tons of frozen Atlantic tuna transshipped to the United States were 7 percent less than the previous year. Of that total, yellowfin accounted for 10,200 short tons, 15 percent less than the previous year when 12,200 tons were shipped.

The albacore catch in the Atlantic improved after the season's opening the beginning of September 1961 and amounted to 1,840 metric tons, 140 percent more than the 760 tons caught the previous year.

Direct shipments from Japan to the United States and Canada amounted to 27,500 short tons during the first six months of fiscal year 1961, 5 percent less than the previous year. Two of Japan's largest fishery firms were the shippers. Of the total shipped, 9,100 tons were albacore (8 percent less than the 9,900 tons shipped a year earlier) and 18,400 short tons were yellowfin (3 percent less than the 18,900 tons a year earlier). Included in the albacore shipment was a transshipment from Suva, Fiji Islands. This was the quantity shipped as of the end of September 1961, but higher ex-vessel prices in the United States have heightened interest in exports. As of October 10, an additional 11,600 tons of albacore and 20,000 tons of yellowfin were shipped to the United States direct from Japan. This meant increasing the quota for direct shipments from Japan and the adjustment regulation drafting committee was studying the need for an increase in the quota. (Suisan Keizai Shimbun, October 14, 1961.)

Editor's Note: The data in this article differ from those in the previous article, but are believed to be more recent.

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FROZEN TUNA EXPORT QUOTAS AND SALES PROCEDURE CHANGES CONSIDERED:

On October 3, 1961, the Japanese Export Frozen Tuna Producers Association's Atlantic Ocean Tuna Liaison Committee met to discuss how sales of frozen Atlantic Ocean tuna transshipped to the United States should be handled in the future. The Liaison Committee agreed that beginning in January 1962, Atlantic Ocean-caught tuna should be sold through the Export Frozen Tuna Sales Company.

On October 5, the Association's board of directors met to discuss the problem of placing frozen albacore and yellowfin tuna under one over-all export quota and handling all sales of frozen yellowfin from Japan proper through the Sales Company.

The question of combining exports from Japan proper of frozen albacore and yellowfin under one over-all quota came up as a result of what was considered to be an insufficient export quota for yellowfin. Combining the albacore and yellowfin export quotas would make it possible to export more frozen yellowfin when albacore supplies are short; whereas, under the present quota system (one quota for frozen albacore and another for frozen yellowfin), it would not be possible to utilize the unused portion of a quota for one species by substituting another species in its place.

Japan (Contd.):

Strong opinions prevailed at the board of directors meeting that it would be undesirable to change the separate quota system and that the export quota of 30,000 tons for frozen yellowfin should be raised to 35,000 tons or 40,000 tons instead. This matter is to be discussed further by the board of directors as soon as it receives a report from the committee appointed to draft proposals concerning changes in export regulations. This committee was scheduled to meet during the week of October 8.

The question of yellowfin sales through the Sales Company arose as a result of claims made by the Exporters Association that yellowfin exports should be handled through the Sales Company in the same manner as albacore exports, since this would simplify business transactions. After deliberating over this matter, the Producers Association's board of directors agreed to consider the proposals made by the Exporters Association and to study this matter further. (Suisan Tsushin, October 4 & 6, 1961.)

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FROZEN TUNA DELIVERIES TO YUGOSLAVIA EXPECTED TO DROP:

The Japanese long-line tuna vessels operating in the Atlantic Ocean planned to fish along the Brazilian side of the Atlantic Ocean for albacore during the last three months in 1961. Their catch is expected to be exported to the United States, and this means that there will be less tuna available for export to Europe.

Yugoslavia wants to import a total of 4,900 metric tons between October and December (October--1,600 metric tons; November--1,800 tons; December--1,500 tons). However, indications are that Japan will not be able to deliver more than 430 tons (October--250 tons; November--180 tons), or less than 10 percent of the total amount desired by Yugoslavia. (Suisan Tsushin, September 14, 1961.)

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NEW REGULATIONS ON FROZEN TUNA LANDINGS AND TRANSSHIPMENTS:

The Japanese Fishery Agency made public in September 1961, the following regulations governing the operations of Japanese tuna vessels in the Atlantic Ocean, Pacific Ocean, and the Indian Ocean.

Atlantic Ocean: Medium-type tuna vessels, distant-water tuna vessels, and portable-vessel-carrying tuna motherships shall be authorized to operate in the Atlantic Ocean for specified periods, except (1) when they do not have plans to export their catches to foreign countries; (2) when their operations are considered to have a bad effect on international relations; (3) when they plan to operate in the Atlantic Ocean for a period of over two years.

Essentially, all vessels must file with the Fishery Agency applications indicating their intent to engage in the Atlantic Ocean tuna fishery and must submit certain prescribed documents.

Permission to land or transfer catches, including products produced from the catches, at ports bordering the Atlantic Ocean, shall be granted separately for each trip, as a rule. However, permission will not be granted (1) when it is not altogether clear whether the catches, including products produced from the catches, will be consumed in the country to which they are delivered; (2) when it is felt that approval may result in obstructing the promotion of direct Japanese tuna exports.

Transfer at sea from one vessel to another of catches, including products produced from those catches, shall be prohibited.

Medium-type tuna vessels and distant water tuna vessels planning to land or transfer their catches, including products processed from the catches, at ports bordering the Atlantic Ocean must submit applications beforehand for clearance.

Portable-vessel-carrying tuna motherships planning to land or transfer their catches, including products produced from the catches, at ports bordering the Atlantic Ocean must submit certain prescribed documents before departing their Japanese home ports. They must also apply for clearance each time they want to land or transfer their catches at ports bordering the Atlantic Ocean.

Vessels which plan to export tuna to those localities not governed by the export regulations of the Export Frozen Tuna Producers Association, and plan to land or transfer their catches at ports bordering the Atlantic Ocean over an extended period of time at intermittent intervals, must first be cleared before they leave their Japanese home ports.

Indian and Pacific Oceans: Medium-type tuna vessels, distant-water tuna vessels, and portable-vessel-carrying tuna motherships will not as a rule be permitted to land or transfer their catches, including products processed from the catches, at ports other than Japanese ports. This rule will not apply in the case where it is clear that the catches or products will be consumed in the foreign country that they were delivered to. Landings of tuna at Samoa and Santo are also exempt from this ruling.

Applications to land catches, including products produced from the catches, at ports other than Japanese ports must be submitted in accordance with regulations governing the landing or transfer of tuna in the ports bordering the Atlantic Ocean.

Transfer of catches, including products processed from the catches, for the purpose of shipping them to Japan by vessels other than by vessels which originally landed the fish shall be prohibited. Such transfers shall be allowed only when it becomes necessary to transship tuna from the Atlantic Ocean to Japan to stabilize market conditions or permit the maximum utilization of the catch.

Medium-type tuna vessels and distant-water tuna vessels must submit a report to the Fishery Agency Director within 30 days after they land or transfer their catches, including products produced from the catches, at a foreign port. (Shin Suisan Shimbun, September 25, 1961.)

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RESTRICTIONS ON PORTABLE-VESSEL-CARRYING TUNA MOTHERSHIPS RELAXED: On September 20, 1961, the Japanese Fishery Agency announced changes in the regulations governing portable-vessel-carrying tuna motherships. The original regulations were formulated in April 1961 but industry claimed that they were too strict and impractical, and had requested that they be revised.

The biggest change is in the relaxation of restrictions on the building of portable vessels. Under the old regulations, which permitted the use of two or more portable vessels, to construct a second portable vessel one distant-water tuna fishing vessel of 180 tons or less had to be withdrawn from the fishery and 25 tons of this vessel put up as replacement, with the remaining tonnage of the retired vessel to be used in enlarging other medium and distant-water fishing vessels. The new regulations authorize the use of three or more portable vessels and only one distant-water vessel need be retired for every two portable vessels beyond the first two.1/ However, size of the portable vessels would be restricted to 25 tons or less, as before.

Other important features of the revised regulations are:

A vessel will be licensed as a portable-vessel-carrying tuna mothership when one or more distant-water tuna fishing vessels of equivalent total tonnage as that of the vessel to be used as a mothership are retired from the fishery. In other words, two distant-water vessels of, say, 500 tons each could be put up as replacement to construct a 1,000-ton mothership.

Restrictions on the amount of distant-water vessel tonnages that can be used as replacement in constructing a larger tuna mothership shall be waived. However, the remaining unused tonnage of distant-water vessels cannot be used to enlarge medium-type or distant-water type vessels. They can only be used as replacement for constructing portable vessels.

Vessels will no longer carry dual classifications. They shall either be classified as a distant-water tuna fishing vessel or a portable-vessel-carrying tuna mothership. Those distant-water tuna fishing vessels converting to tuna motherships cannot revert to their original classification. This measure eliminates the confusion of classifying a vessel as a portable-vessel-carrying tuna mothership one part of the fishing season, and as a distant-water tuna vessel during another part of the year, depending on its operation.

The use of distant-water tuna fishing vessels over 180 tons for replacement purposes was authorized until November 30, 1961, only when such vessels were used primarily as replacements for the construction of portable vessels. This measure made it possible for all firms planning to operate portable-vessel-carrying tuna motherships to retire only one large distant-water tuna fishing vessel, say, one of 450 tons or larger, the vessel rights of which they could share to construct portable vessels for their motherships. (Suisan Keizai Shimbun, September 21, Shin Suisan Shimbun, September 25, 1961.)

1/ This is interpreted to mean that only 25 tons of a distant-water tuna vessel need be put up as replacement to construct every two portable vessels over and above the first two.

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Japan (Contd.)

STUDY OF POLE-AND-LINE SKIPJACK FISHERY UNDER WAY:

The Japanese National Federation of Tuna and Skipjack Fishing Cooperative Association has started a study of the problems involving the management of pole-and-line skipjack tuna fishing vessels. Over the years, the pole-and-line skipjack fleet has dwindled from about 500 vessels in 1955 to its present fleet of 348 vessels, of which 140 are medium-type (40 to 100 gross tons) and the remainder of less than 39 tons gross. This reduction in the fleet is attributed to the unstableness of the pole-and-line fishery and to the trend among owners of medium-type vessels to build larger vessels for distant-water tuna fishing. Medium-type vessels can be used as replacements in building larger vessels; whereas vessels under 39 tons, for which licenses are not required, cannot be used for this purpose.

The unstableness of the skipjack fishery is reflected in the catch of the pole-and-line vessels. Pole-and-line vessel landings dropped substantially in 1960, the decline occurring mainly in the catch of skipjack (see table).

Japanese Pole-and-Line Landings of Skipjack and Other Tuna, 1958-1960

Year	Skipjack	Other Tuna
	(Metric Tons)	
1960	78,546	109,577
1959	166,628	182,782
1958	1/	184,527

1/Not available

In addition to the decline in the catch of skipjack, the lower price which this species normally commands is reported to be a factor contributing to the unstableness of the pole-and-line fishery. It is estimated that a pole-and-line skipjack vessel must land over 25 million yen (about US$70,000) worth of fish per year to show a profit, but that only about half of the fleet ever takes in more than this amount.

There is a definite trend towards building of larger vessels in the tuna fishery. The drop in the number of vessels in the tuna and skipjack fleet has occurred mainly in the number of medium-type fishing vessels, which also engage in skipjack fishing. This class of vessels has been used to a large extent for tonnage replacement purposes to construct large distant-water tuna vessels. (Suisan Keizai Shimbun, September 20 and May 31, 1961.)

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IMPORTS OF CERTAIN MARINE PRODUCTS LIBERALIZED:

The Japanese Government plans to permit the importation of a number of marine products under a new trade liberalization policy. This policy is to be carried out in three successive stages extending over a period of one year. The most recent revised schedule of this plan calls for the removal of restrictions on imports of fresh and frozen tuna, swordfish, salmon, and all shellfish except scallops, beginning October 1, 1961.

The final draft of the plan was compiled by the Economic Planning Board, an independent agency directly responsible to the prime minister, after it held consultations with the Ministry of International Trade and Industry, Ministry of Agriculture and Forestry, and the Ministry of Finance. On September 26, the plan was to be submitted for discussion at a meeting of departmental heads concerned with the national economy.

The following marine products are covered in the final draft of the plan which was under consideration in September 1961:

Effective Date of Coverage	Description of Commodities
October 1, 1961	Fresh and frozen: tuna, swordfish, red snapper, salmon, sea cucumber, salmon roe, crustaceans, mollusks (except scallops).
	Others: salted salmon roe, whale oil, dried skipjack (katsuobushi)
April 1, 1962	agar-agar
October 1, 1962	Fresh and frozen: whale meat, yellowtail, jack mackerel, Pacific mackerel, sardine.
	Salted and dried: yellowtail, sardine, saury, jack mackerel, Pacific mackerel.
	Salted and smoked: whale meat.
	Others: dried cuttlefish, pearl.

Insofar as items like fish meal, fish oil, scallop, scallop muscle, herring, herring roe, and cod (including Alaska pollock) are concerned, they will not likely be covered under the trade liberalization plan for some time. The Japanese Government plans to take up those items separately as they are covered under the General Agreement on Tariffs and Trade. (Suisan Keizai Shimbun, September 22, 1961.)

Translator's Note: At the present time, imports into Japan are permitted under one of three systems. They are the Automatic Approval (AA) system, Automatic Fund Allocation (AFA) system, and a third system which covers items not covered under the first two systems. These three systems are briefly described on the following page:

Japan (Contd.):

The AA system is the least restrictive of all the three systems. Commodities listed under that category can be imported into Japan simply by arranging for an allocation of foreign funds directly with a bank.

The AFA system is more restrictive than the AA system. Items listed under the AFA system can only be imported after approval has been obtained first from the Ministry of International Trade and Industry (MITI). Thus, MITI is in a position to exercise control over imports of commodities in that category, if necessary. Upon obtaining MITI's approval, an importer can then negotiate directly with a bank for an allocation of foreign funds.

The third system is the most restrictive of all the three systems. Imports of items listed under that classification are strictly controlled by the Japanese Government. They include such commodities as foodstuffs (rice, for example), coal, tobacco, petroleum, machinery, etc.

Japan is liberalizing trade by changing the classifications of different commodities, placing many of the items now covered under the more stringent systems under the more liberal systems. For example, some marine products, such as shrimp and salmon, imports of which were allowed to some extent in the past by MITI under the AFA system, are being reclassified under the AA system. As far as can be ascertained, all the marine products listed in the schedule shown above in the news report are to be classified under the AA system.

According to information provided by the Consulate-General of Japan, in Los Angeles, the AA and AFA systems presently account for about 65 percent of total imports into Japan. A year from now, under the trade liberalization policy, these two systems should account for about 90 percent of total Japanese imports.

The relaxing of trade restrictions on tuna, imports of which apparently were not permitted in the past, is posing a problem to the Fishery Agency.

Insofar as tariffs are concerned, one Japanese trade paper reported earlier that the Japanese Government was planning to impose a duty of 10 percent on imports of fresh and frozen tuna, and 15 percent on imports of processed tuna. Japan enacted a new tariff law on March 31, 1961, by which the Government can change a tariff rate by Cabinet Ordinance when the existing tariff rate is considered to be damaging to the national economy. Previously, the Japanese Diet acted on such legislation. This law makes it possible for the Japanese Government to act rapidly in a situation where, for example, Japan finds herself the target of a dumping operation. The law includes two other important provisions. They are: (1) authority to adopt a tariff quota system by means of which the Government can prescribe a higher tariff for goods imported over and above a certain annual quantity; and (2) provisions whereby the Government can make exemptions or refund duties on commodities administratively determined to be in critical demand in Japan.

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TUNA IMPORTS LIBERALIZED:

Effective in October 1961, the Japanese Government liberalized the importation of tuna into Japan under that country's trade liberalization plan. However, this measure is expected to have very little effect upon the Japanese tuna industry. The Japanese Fishery Agency feels that placing tuna on the trade liberalization list, now that the Japanese Government is relaxing trade restrictions, was only natural in view of the fact that the supply of tuna in Japan is expected to decline following an increase in the use of this product by Japanese fish sausage makers and the continued growth of the United States tuna market.

The Fishery Agency considers that tuna-producing countries, like the United States, Peru, and France, are not in a position to produce more tuna for export beyond their present capabilities. Very little tuna is expected to be imported by Japan, although tuna from such countries as Formosa and Okinawa may be imported to some extent. (Shin Suisan Shimbun Sokuho, September 21, 1961.)

Translator's Note: According to one earlier press report, an import duty of 10 percent may be levied on fresh and frozen tuna imported into Japan and 15 percent on processed tuna products.

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Japan (Contd.):

UNLICENSED TUNA VESSELS MAY BE REGISTERED UNDER FOREIGN FLAG:

The lifting of existing trade restrictions on marine products imports as proposed in the final draft now under consideration by the Japanese Government is expected to have little effect on the Japanese fishing industry as a whole. However, now that the Government is planning to allow tuna to be imported into Japan, the Fishery Agency expects that attempts will be made to dispatch fishing vessels without tuna fishing licenses to overseas bases, register these vessels under foreign flags, then convert them for tuna fishing and export their catch to Japan.

Under present conditions, the Fishery Agency would not be able to curb such trends effectively, inasmuch as it is not empowered to check the transfer of unlicensed vessels to jointly-operated overseas fishing bases. Such transfers are classified as exports, and the Ministry of International Trade and Industry and the Ministry of Transportation are responsible for these matters, although these two ministries do consult the Fishery Agency.

Also, the lack of a clearly defined Government policy concerning the establishment and management of overseas bases will make it somewhat difficult for the Fishery Agency to curb the transfer of unlicensed vessels to overseas bases. Applications to establish overseas bases had until now been judged on their individual merits. To correct this situation, in July 1961 the Fishery Agency requested all national and prefectural governmental agencies to submit a review of policies followed in licensing overseas bases. These reports are now being studied by the Agency for the purpose of adopting a uniform national policy.

On the other hand, the National Federation of Skipjack and Tuna Fishing Cooperative Associations takes the view that, in addition to the study being made by the Fishery Agency, consideration should be given to the stabilization of tuna prices in the light of the new trade policy, which would permit tuna to be imported into Japan, and which, in turn, would likely affect domestic prices. The National Federation appears to want tuna included in the Government's production adjustment and price stabilization programs, and intends to submit its recommendations to the proper authorities. (Nippon Suisan Shimbun, September 20, 1961, and miscellaneous sources.)

Translator's Note: In connection with the problem discussed in the above news article, the Japanese policy concerning the licensing of tuna vessels should perhaps be explained at this time.

The Japanese Fishery Agency rigidly controls the size of the Japanese tuna fleet over 40 tons gross (vessels under 39 tons do not require licenses) by limiting the total tonnage of all vessels in this category. Tuna vessels in this category are further classified as medium-type (40 to 100 tons gross) and distant-water tuna fishing vessels (over 100 tons gross).

New tuna vessels over 40 tons gross can only be built by retiring existing vessels through an intricate system of rules evolved by the Fishery Agency. Occasionally, these regulations are relaxed, permitting the construction of vessels larger than those replaced, as was the case in December 1960.

Thus, the restrictions placed on the construction of new tuna vessels over 40 tons serve to place a premium on existing tuna fishing licenses. These licenses are sold or traded on the basis of so many dollars a vessel ton, and recent reports indicate that this "right," as it is commonly called, is selling for over $800 a ton. This means that a person who does not own a tuna fishing license and who wants to build a tuna vessel, say of 100 gross tons, must first acquire the "right" to a 100-ton vessel. In other words, he must pay the equivalent of $80,000 for a tuna fishing license before he can even start building his 100-ton vessel, the construction cost of which is extra.

Insofar as the operation of tuna vessels out of overseas bases are concerned, the Fishery Agency frowns on the utilization of vessels out of overseas bases when such vessels are not properly authorized by the Agency to engage in tuna fishing.

Conceivably, Japanese firms with overseas bases could very well take advantage of the proposed trade liberalization program, which would allow tuna to be imported into Japan, by increasing their tuna vessels operating out of overseas bases and exporting their catches to Japan. Their overseas fleet could be increased by one of two means: (1) Dispatch vessels under 39 tons, for which tuna fishing licenses are not required, to overseas bases, with permission from the Fishery Agency; (2) "Export" to foreign countries (a) vessels less than 39 tons, and/or (b) vessels over 40 tons not now registered as tuna vessels in Japan and convert them for tuna fishing, once their registrations have been changed.

An example of (1) is seen where a large fishing company has submitted an application to dispatch tuna fishing vessels under 39 tons to an overseas base, according to a recent trade article. The Fishery Agency is reported to be studying this application carefully in view of the Government's plan to liberalize trade in tuna. As for (2), the Fishery Agency is fully cognizant that such a trend may develop and hopes to develop measures to cope with it.

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SHRIMP INDUSTRY AND MARKET TRENDS:

Shrimp imported by Japan are sold to tempura restaurants, other public eating houses, retail stores, and to wholesale houses. The major outlet for imported shrimp are the tempura restaurants. In Tokyo alone there are 110 large and approximately 500 small tempura restaurants and about 5,700 other restaurants which include shrimp tempura on their menus. Small quantities are sold to retail and wholesale dealers.

The preferable sizes for this trade are shrimp of 10-15 count to the pound and 21-25 count. The August 1961 c.i.f. prices for 10-15 count were 85 U.S. cents a pound and for the 21-25 count 80 cents a pound.

A shrimp fishery for taisho-ebi (Penaeus orientalis), a large shrimp, has developed rapidly in the Yellow Sea between Korea and Red China. This fishery is operated by two of Japan's leading fishery companies located at two ports--Tobata (Kyushu) and Shimoneseki. The shrimp beds are located in relatively deep waters (about 80 fathoms) and large boats and gear are required for this operation. The fishery takes place from November to March which is at a different time of year than for the other shrimp fisheries. The 1960 catch was estimated at 6,500 metric tons, consisting of shrimp about 340 mm. (13.4 inches) in length. Industry sources forecast that with reduced catches in January, February, and March 1961 production this year will be 30 percent less than in 1960.

In 1959, Japan's landings of taisho-ebi amounted to 6,532 metric tons of heads-off shrimp. During the first six months of the year domestic market demands were met and fishing companies conducted a profitable export business. During the last six months of 1959; however, there was a reversal in marketing trends. With reduced inventories and with good consumer demand, prices for large shrimp in Japan moved upward, making it profitable to import shrimp. Heavy domestic market demand continued in 1960 and 1961. This situation coupled with high domestic prices made shrimp relatively unprofitable. Japan exported 360 tons of frozen headless shrimp to the United States in 1960 as compared to 1,385 tons in 1959. Exports of frozen peeled shrimp in 1959 of 950 tons dropped to 700 tons in 1960. Exports to the United States for the first six months of 1961 consisted only of frozen peeled shrimp amounting to 400 tons.

Japan (Contd.):

Since July 12, 1961, imports of shrimp are no longer subject to exchange controls under the exchange allocation system of the Japanese Government. In other words, shrimp are now on the so-called automatic-approval (AA) list, which means that importers are not required to obtain a license in advance in order to import shrimp. As a result of this action, industry sources estimate that Japan will be importing about 5,000 tons of frozen heads-off shrimp in 1961. Of this total, it is estimated that about 3,000 tons will be imported from the United States and 2,000 tons from other shrimp producing countries. During the first five months of 1961, imports from the United States have amounted to over 500 metric tons.

The outlook for continued imports of shrimp to Japan in 1962, according to an industry source, will depend upon: (1) domestic production of large shrimp; (2) market conditions in foreign countries; and (3) the strength of the domestic market.

It is forecast that approximately 1,050 tons of frozen, peeled shrimp will be exported annually of which 800 tons will be consigned to the United States and 250 tons to Great Britain. During the first half of 1961, about 400 tons of frozen peeled shrimp had been exported to the United States. No frozen heads-off shrimp were exported to the United States during that period.

Estimates for 1962 place Japan's total consumption of large heads-off shrimp at approximately 10,000 tons which includes both domestic production and imports. Japanese shrimp interests forecast that prices for shrimp in the United States will continue at high levels and with a stabilized market in Japan shrimp will be imported only from Iran, Hong Kong, the China Mainland, and that imports from Mexico and other Latin American countries will be by direct shipment instead of being re-exported from the United States.

It is estimated that the 1962 production of species of shrimp other than taisho-ebi will be approximately 45,000-50,000 metric tons. Since those shrimp command a different market, that production will not influence the market demand for the large varieties of shrimp.

There are at least 29 kinds of shrimp which are taken commercially in Japan. Four of these are actually fresh-water species taken in Lake Biwa and elsewhere. The marine species are, however, by far the most important commercially from the standpoint of present domestic use and export values.

Of the marine species there are two basic groups: the Pandalid type shrimp found off Northern Honshu and Hokkaido is similar in habitat to the closely related forms found off Oregon, Washington, Alaska, and in the Gulf of Maine. The average size for the Pandalid shrimp is about 105 mm. (about 4 inches) in length. The Penaeid type shrimp are found in warm waters from Matsushima and Toyama Bay southward (Honshu Island) and are very similar to the shrimp found along the south Atlantic and Gulf coasts in the United States. The sizes range up to 340 mm. (13.4 inches), depending upon the species.

Of the warm-water shrimp, a very important shrimp fishery is that for the kuruma-ebi (Penaeus japonicus). This shrimp is found from Matsushima Bay and southward. The fishery is concentrated in the Inland Sea from June to November. The size of the shrimp is about 270 mm. (10.6 inches) in length and the catch is used almost entirely in the domestic market.

Unique to the shrimp industry is the culture of the kuruma-ebi shrimp in the old salt ponds located at Kumamoto (Kyushu) and Yamaguchi. Each year large numbers of post larvae shrimp are collected and placed in rearing ponds where they are fed to attain good growth. In 1960, a project was initiated to rear shrimp directly from brood stock. These installations are located at Takamatsu (Shikoku). In the first year of operation one ton of shrimp was marketed. These shrimp are sold at 200 mm. (about 8 inches) in length heads-off. Production in 1961 will be approximately 2 tons. In order to operate this project on a profitable basis at least 300 tons of shrimp must be produced annually.

The landings of shrimp in Japan rose sharply in 1958 and rose more slowly but steadily subsequently. Total production for 1960 was estimated at 67,500 tons, an increase of 13.4 percent over the 59,548 tons landed in 1959, and about 34.4 percent above the 1956 landings of 50,224 tons.

The best prospects of increasing domestic shrimp production appears to be in the Hokkaido area of northern Japan. The Pandalid or small cold-water shrimp grounds in Hokkaido are still only partially exploited. According to the Hokkaido Government officials, there are large stocks of shrimp along the northern coast which are not being fished at the present time and which could easily double present production.

In very recent years, Japan has produced considerable quantities of shrimp in distant waters by mothership fisheries or by agreement with various countries. It is the plan of the fishing companies to operate this type of fishery wherever practicable. (U.S. Fisheries Attache, Tokyo, September 20, 1961.)

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YAIZU FISHERY LANDINGS, SEPTEMBER 1961:

Landings of tuna and other fish at the important Japanese tuna port of Yaizu during September 1961 totaled 7,202 metric tons, 1,200 tons more than for September 1960. The value of the September 1961 landings was US$1,580,556, some $250,000 less than in the same month of 1960.

Yaizu Fishery Landings, September 1961

Species	Metric Tons
Tuna:	
Bluefin	9
Indian bluefin	39
Australian bluefin	1,300
Big-eyed	1,055
Albacore	176
Skipjack	2,623
Yellowfin	737
Other fish	1,263
Total	7,202

Landings of all fish at Yaizu this year during January-September totaled 98,800 tons valued at about $25 million ex-vessel. Tuna made up half of the landings. Ex-vessel prices this year were lower than in the same period of 1960. (Suisan Keizai Shimbun, October 17, 1961.)

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CANNED SARDINE EXPORTS, APRIL-SEPTEMBER 1961:

Data compiled by the Japan Canned Sardine and Saury Sales Company show that sales of Japanese canned sardine for the period April 1 to September 30, 1961, totaled 279,464 cases. This represents a decline of 108,017 cases (28 percent) from the same period in

Japan (Contd.):

1960, attributed primarily to lighter landings of fish.

Japanese Exports of Canned Sardines, April 1-September 1961

Country or Area of Destination	1961	1960
	(Cases)	
Philippine Islands	117,584	238,187
Belgium	47,502	46,688
West Africa	42,096	49,862
Burma	15,587	4
Indonesia	13,674	-
North-Central and South America	11,169	37,720
Other countries	31,852	15,020
Total	279,464	387,481

Canned sardines were exported to Indonesia for the first time this year. Exports to Burma increased during 1961 due to that country substituting sardines for sauries (see table), according to Suisan Tsushin, October 9, 1961.

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SALMON PREDATION BY SHARKS STUDIED:

Japan undertook a full-scale study this year to determine the extent of salmon predation by mackerel and other sharks and dispatched the long-line vessel No. 5 Uraichi Maru (97 gross tons) to determine the distribution of mackerel sharks in the North Pacific Ocean and the Bering Sea, as well as to collect shark stomach samples. This vessel operated in the area bounded by latitudes 40° N. and 52° N. and by longitudes 145° E. and 177° W. for two months beginning in May 1961.

The Uraichi Maru made 56 sets and caught a total of 901 sharks--272 mackerel sharks, 623 blue sharks, and six other species of shark, including dogfish--and tagged 196 mackerel sharks, 494 blue sharks, and 4 dogfish. A total of 44 mackerel sharks was examined, and data on head length, body length, body weight, sex, gonad condition, and other data were collected. Examination of the stomachs of the 44 blue sharks showed that 27, or 61.4 percent, contained food, and 16, or 36.4 percent, contained salmon. Computed on the basis of the stomach samples which contained food, the number of samples containing salmon remains totaled 59.3 percent.

Studies were also conducted on sharks caught by the commercial salmon catcher vessels fishing for the salmon motherships. A total of 3,903 sharks was taken in the commercial gill nets. Examination of the stomach samples of 773 sharks revealed that 332, or 42.9 percent, contained food and 252 samples, or 32.6 percent, contained salmon. Again, based on the samples which only contained food, the number of samples containing salmon totaled 75.9 percent. (Suisan Keizai Shimbun, September 6, 1961.)

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TWO FISH MEAL FACTORYSHIPS EXCEED QUOTAS:

Two fish meal factoryships (Renshin Maru, 14,094 gross tons; Kinyo Maru, 9,373 gross tons) which have been on the Bristol Bay bottomfish grounds since late April 1961 were due to leave the fishing grounds in late September. The Renshin Maru was scheduled to arrive at Yokohama on October 11 and the Kinyo Maru at Hakodate on October 13, with a combined total of over 33,000 metric tons of fish meal.

These two factoryships have already met their respective targets. The Kinyo Maru, which had a production target of 14,000 tons of fish meal, is expected to bring back well over 15,000 tons of fish meal; the Renshin Maru, with a quota of 16,000 tons of fish meal, was expected to produce 18,000 tons. The Renshin Maru was scheduled to depart for West Africa in late October, where she expected to operate off Angola for a period of about 75 days. Her production target for this operation was 7,000 to 8,000 tons of fish meal.

The Japanese Ministry of International Trade and Industry (MITI) announced that it had allocated $660,000 in foreign currency for importing 27,000 metric tons of fresh fish for use in producing fish meal and oil. This money was allocated to a large fishing firm, which has sent its fish meal factoryship Renshin Maru to operate off Angola, West Africa. The money is to pay the Angolan fishermen for the catches delivered to the factoryship for processing into fish meal and oil.

The owner of the Renshin Maru and the Kinyo Maru hope to sell the fish meal production for an average price of 54,000 yen (US$150) per metric ton. On the basis of this price, both factoryships were expected to show profits of about 100 million yen ($278,000) each.

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EXPERIMENTAL KING CRAB FACTORYSHIP IN BERING SEA:

The same company's freezer factoryship Shinyo Maru (5,630 gross tons) was tentatively scheduled to leave the

Crab boats leaving Japanese king crab factoryship in Bering Sea to haul in nets.

Japan (Contd.):

eastern Bering Sea fishing grounds either in late September or in early October and dock at Aomori in northern Japan. The Shinyo Maru, which was licensed as an experimental king crab freezer vessel by the Japanese Fishery Agency, was on the fishing grounds since mid-April. Reports indicated that during the first half of September the vessel operated in the vicinity of 57° to 58° N. latitude and 171° W. longitude. (Nippon Suisan Shimbun, September 18, Suisan Keizai Shimbun, September 16, 1961, and miscellaneous sources.)

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INDUSTRY HOPES TO SEE WATERS SOUTH OF ALASKA PENINSULA OPENED TO FISHING:

The Japanese fishing industry is showing a profound interest in the International North Pacific Fisheries Commission meeting which was held in Tokyo early in November 1961. Industry hopes that the Japanese Government will take up the problem of bottom fish with a positive attitude. Specifically, industry wants the waters to the south of the Alaska Peninsula opened to fishing in 1962 and that Japan be permitted to take halibut on a limited scale within the area east of 175° W. longitude, where Japan has agreed to abstain from taking halibut under the International Convention for the High Seas Fisheries of the North Pacific Ocean.

The Japanese fishery interests claim that the halibut conservation measures of the United States and Canada in the Convention area east of 175° W. longitude, which prohibit Japan from taking halibut, are ineffectual since the Soviet Union, which is not a member of the Convention, is exploiting the halibut stocks in this area.

The Japanese fishing vessels this year have caught close to 10,000 metric tons of halibut in the waters west of 175° W. longitude outside the Convention area. The Japanese fishing industry is strongly urging the Japanese Government to discard its past passive attitude in regard to the Convention and to press for approval of halibut fishing in the Convention area up to an amount of around 3,000 tons. Industry is highly unhappy not only with the Convention itself but with the Fisheries Agency, which is reported to be planning on licensing the operation of drift nets only in the area southeast of the Alaska Peninsula in 1962, and prohibiting long-lining and bottom trawling in that same area so as to prevent halibut from being taken incidentally to other fish.

The Japanese fishing industry claims that it really wants to fish for arrow-toothed halibut (Atherestes species) and rockfish in the Gulf of Alaska and that it would not be profitable for the industry to engage in herring fishing in the Gulf; that rather than completely curtail fishing for rockfish and arrow-toothed halibut for fear halibut may be taken incidentally to those fish, industry wants the Government to allow a limited amount of halibut to be taken.

The Japanese Government, however, cannot support the desire of its fishing industry unless the present Convention is revised. The only recourse open to the Japanese Government under the present arrangement is to counter United States and Canadian arguments by systematically presenting Japan's dissatisfaction with the present enforcement of the abstention principle in regard to halibut. (News item translated from the Japanese periodical Suisan Keizai Shimbun, October 21, 1961.)

Kuwait

PERSIAN GULF FISHING INDUSTRY:

The major fishing interests in Kuwait have pooled their resources and two companies have now been organized to fish the entire Persian (Arabian) Gulf area and possibly the offshore areas of the Sudan. The first modern commercial fishing operation in the Gulf focussed on shrimp and was organized by a Kuwaiti merchant with the cooperation of a United States company. The interest of a Kuwait shaikh in a fishing fleet (an interest inspired by a Sudani entrepeneur and heightened by the success of the already established company's first partial shrimp season--1959/60), the latter part of 1960 assumed formal dimensions. After prolonged negotiations, the two groups merged to create two new companies in which both, with others, would share. One company is based in the city of Kuwait. The owners of the original shrimp fleet (which at the time of merger comprised four trawlers) were paid cash for 71 percent participation by the Shaikh interest. The remaining 29 percent of the company remained in the hands of the original owners. Of the 71 percent, some part is scheduled for outside interests. The second company is based in Dubai and its control is divided as follows: 25 percent to the original owners of the shrimp fleet; 5 percent to the Ruler of Dubai; and 70 percent for the Shaikh group. Although it was originally planned that 20 percent of the latter shares would be assigned to a foreign company which would provide technical advice as well as capital, there is now consideration of revising the share holdings to provide for 50 percent foreign participation.

Although separate legal entities, the two companies will in fact, at least initially, share facilities, fishing fleet, and top-level management. A new office has been opened in Kuwait from which the planning for both operations emanates. This office belongs to the first of the two companies mentioned, which was as of early October 1961 the only one of the two companies "off the ground."

The Kuwait-based company, as indicated above, will essentially be an extension and expansion of the shrimp operation which began its third season in the fall of 1961. During the first partial and second full seasons, the original fleet of 2 trawlers of 15- and 17-ton capacity, respectively, increased to 4 trawlers; all brought from the United States.

Kuwait (Contd.):

Since the merger of the companies, 3 more locally-built trawlers of unknown capacity were purchased. (The names of the seven trawlers are: Dasman I, Naktoom, Rihab, Taroob, Zafar, Rubyan and Rashid.) It is hoped that at least 20 more locally-built craft will join the fleet in the next two years. The pace at which trawlers are added to the fleet will depend on many developments whose outcome is not now predictable. These include the following:

1. The catch in 1961 and related experience which will have a bearing on the extent of the fishing potential in the Gulf: The shrimp take in 1960 was "not up to expectations" according to officials of the company, who attributed this fact to the dynamiting which accompanied an oil company's geophysical and seismic survey of its offshore petroleum concession area. However, company officials and the United States trawler captains are unwaveringly optimistic about the vast potential of the Gulf and look forward to the 1961 catch to prove the point.

2. Markets: Company officials have no doubt they are able to sell abroad (mostly to the United States) all of the shrimp caught. The United States company has been retained as an "agent" for distribution and the company hopes to handle the anticipated increased shrimp catch and to improve the product by installing automatic shrimp-processing machinery. Negotiations have been under way for some time with a Geneva firm whose representatives visited Kuwait early in 1961 and apparently were successful in persuading company officials of the value of automation. However, the project will be held in abeyance until a disputed piece of land along the harbor, a necessary location for the plant, comes into the hands of the company. Arrangements have also been made to cover the local market more effectively and to begin introducing a variety of Gulf fish into the regional market. The company plans to open soon in Kuwait a new privately-owned fish market containing the most modern of refrigeration conveniences for the sale of both fresh and frozen fish of all varieties. The company hopes also to be able to contract with the large foreign (mostly oil) companies in the vicinity and with the Kuwait Government to supply them with fish. Regional distribution will begin with Lebanon. The company is arranging an outlet in Beirut and plans to ship fresh and frozen fish by air in the return flight of the craft now chartered to bring fresh fruit and vegetables to Kuwait from Lebanon. In the longer run, company officials think in terms of a fleet of refrigerated trucks transporting and exchanging the green produce of its neighbors and Kuwait's fish.

3. The rapidity of the development of fish processing capability: Although the only tried and hitherto successful aspect of commercial fishing for export in the Gulf has been for shrimp, the company officials have based the founding of both companies on the expectation of large-scale fish processing including the freezing, canning, and smoking of fish, production of fish meal, and extracting of fish oil. As conceived, the major part of the fish-processing aspects of the business would be based in Dubai and vested in the second fishing company mentioned. However, progress there will depend on the speed with which foreign technical and capital help becomes available and the success which attends the other elements of the business. (United States Embassy, Kuwait, October 2, 1961.)

Libya

BUREAU FOR FISHERIES AFFAIRS SET UP:

A Bureau for Fisheries Affairs as part of the Ministry of National Economy of Libya was created by Ministerial Resolution No. 1/1961 published in the Federal Official Gazette of June 29, 1961. The lack of such an

agency previously made it difficult to coordinate recommendations of foreign experts who were making Libyan fisheries studies. The agency was set up in order to facilitate the work of technical aid fisheries experts expected to advise the Libyan Government, and who may be seconded by the Governments of Germany, Japan, the United Kingdom, or Nationalist China.

Libya (Contd.):

The new Bureau shall be responsible for:

(a) Carrying out researches and collection of data and statistics on fish, fishing, marketing and industrialization of fish, and publishing such data and statistics.

(b) Laying down sound plans and rules for this industry.

(c) Guiding and giving advice on the most modern methods used in fishing, preparation, preserving, transporting, and giving advice and aid on increasing the production and marketing of fish, and encouraging fishermen to adopt such advice and training workers in fishing.

(d) Proposing the arrangements necessary for aiding fishermen and providing them with modern tools and equipment therefor.

(e) Encouraging and assisting the forming of fishing cooperatives.

(f) Consulting and cooperating if necessary with the competent foreign or international bodies with a view to verifying the foregoing purposes.

(g) Proposing the regulations deemed necessary for the protection, administration, investment, and improving the traps and doing other things related to fishing or fishing industry. (United States Embassy, Tripoli, September 23, 1961.)

Mexico

GUYMAS SHRIMP FISHERY TRENDS, 1960/61 SEASON:

The Gulf of California deep-sea fishing season closed on July 15, 1961, when the "veda" or prohibition on shrimp fishing in the Gulf went into effect. Fishing activities in September 1961 were resumed on a highly optimistic note. Shrimp were plentiful and United States market prices were at a high level.

Total shrimp landings by the Guaymas fleet during the 1960/61 season, which closed on July 16, 1961, were 15.6 million pounds as compared with the almost 12.0 million pounds in the 1959/60 season. Of the total catch, 14.5 million pounds were caught on the high seas and 1.1 million pounds in the coastal areas. The number of deep-sea vessels at Guaymas which are ready for the 1961/62 season was reduced to 182. Five vessels were lost during the past season and only one new vessel was added to the fleet. Although prices for shrimp during the 1960/61 season were below normal, the season was mildly successful due to the increase in shrimp landings of 3.6 million pounds.

The prohibition on shrimp fishing in the coastal areas by small craft was lifted on September 1. Since there is practically no communication with the small ports where bay fishing is economically important, specific data on the actual amount of the catch in those ports are not available, but all indicators point to a fine season there as of mid-October 1961.

During the first five days of the deep-sea fishing season, 34,000 pounds were landed at Guaymas by 9 vessels. The shrimp were caught relatively near the port.

During the "veda" or closed season offshore, nearly the whole Guaymas fleet stayed in port for refitting instead of fishing off the west coast of Baja California. When the "veda" was lifted for deep-sea fishing, 161 craft left port. The remaining vessels in the harbor were held up by ice shortages and incompleted repairs. This fall, the number of vessels in the Guaymas fishing area is expected to be augmented by 10 vessels from Salina Cruz, Oaxaca.

In October, the spiny lobster fishing season began at Bahia Kino in Sonora. Spiny lobster prices were 15 pesos a kilo (54.5 U.S. cents a pound) ex-vessel, and fishermen were hopeful for an improvement over last season's poor landings of 45 metric tons. Lobsters in the Bahia Kino area are caught with traps and by divers.

A "veda" or closed season was placed on the capture, sale, and consumption of marine turtles and marine turtle eggs, effective September 14, 1961.

In his inaugural speech, Governor Encinas of Sonora stated that credits would be made available for the construction of more fish-processing plants and promised more aid for fishing cooperatives. (United States Consulate, Nogales, report of October 13, 1961.)

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FISH LANDINGS AT VERACRUZ REPORTED LIGHT:

The principal species of fresh fish landed in the state of Veracruz (namely the cities of Veracruz and Alvarado) totaled only 569 metric tons during the first 6 months of 1961, according to a United States Consular dispatch dated September 15, 1961, from Veracruz. (Alvarado depends on fishing almost entirely.)

A stand in the fresh fish and shellfish market in Veracruz.

Mexico (Contd.):

The largest decline in catch was reported by Alvarado for sierra or Spanish mackerel--only 88 metric tons were landed at that city during the first 6 months of 1961 in contrast to 461 tons during the calendar year of 1960. Robalo (snook) landings also decreased considerably this year with only 168 tons landed the first 6 months this year as against 558 tons during all of 1960.

For Alvarado 1960 was a poor year with landings only a little more than half of each of the previous three years, and 1961 landings will probably be even lower. In addition, the city's fish office reports that the oyster beds in the area have been destroyed by floods in the last four years. But that office pointed out that the area's shrimp fleet has been increasing and should result in an increase in shrimp landings in the future.

The Veracruz city fish office reports that only 320 tons of sierra or Spanish mackerel were landed in that city through March 1961 as compared to 669 tons in the same period of 1960. (United States Embassy, Veracruz, September 15, 1961.)

Nigeria

FISHERY LANDINGS, 1960:

In 1960, Nigeria's fresh-water fish landings of 30,000 metric tons exceeded marine landings of 28,600 tons.

The marine landings were made chiefly by the indigenous canoe fishery which brought in approximately 25,000 tons. Trawlers based in Nigeria landed only about 3,600 tons of fish. Dugout canoes and ring-gill nets are used for fishing bonga (Ethmalosa sp.) and sardines (Sardinella sp.). Beach seines are also employed.

A 20-foot aluminum surf boat designed and built for the Nigeria Federal Fisheries Department in 1956. An experimental vessel for ring-net fishing. Rudder being placed in position prior to sailing for its first trials.

It is thought that the bonga fishery could contribute to a substantial increase in production, even for fish meal. The sardine resource, however, is thought to be limited. Eleven trawlers operate out of Lagos and land 250 to 300 tons of fish monthly (about 3,500 tons annually). The inshore grounds where they fish are considered capable of supporting a maximum of 40 trawlers producing about 10,000 tons annually. (Fisheries Survey of Nigeria, ICA Consultants Reports, Series No. 3., August 14, 1961.)

Peru

INDUSTRY TO MANUFACTURE FISH FLOUR:

The President of the Peruvian National Fisheries Society announced that a group of Peruvian fish meal producers have decided to begin manufacture of edible fish flour. The decision was made after medical experiments proved the high protein value of fish flour for human consumption.

Nutritional experiments on use of fish flour are being carried out by a Peruvian doctor. Undernourished infants at the British-American Hospital in Lima are fed fish flour. Results have been most satisfactory. Edible fish flour is not yet produced in Peru, but if production can begin on a large enough scale with a low enough price for consumers, it will have important economic consequences. (United States Embassy, Lima, September 28, 1961.)

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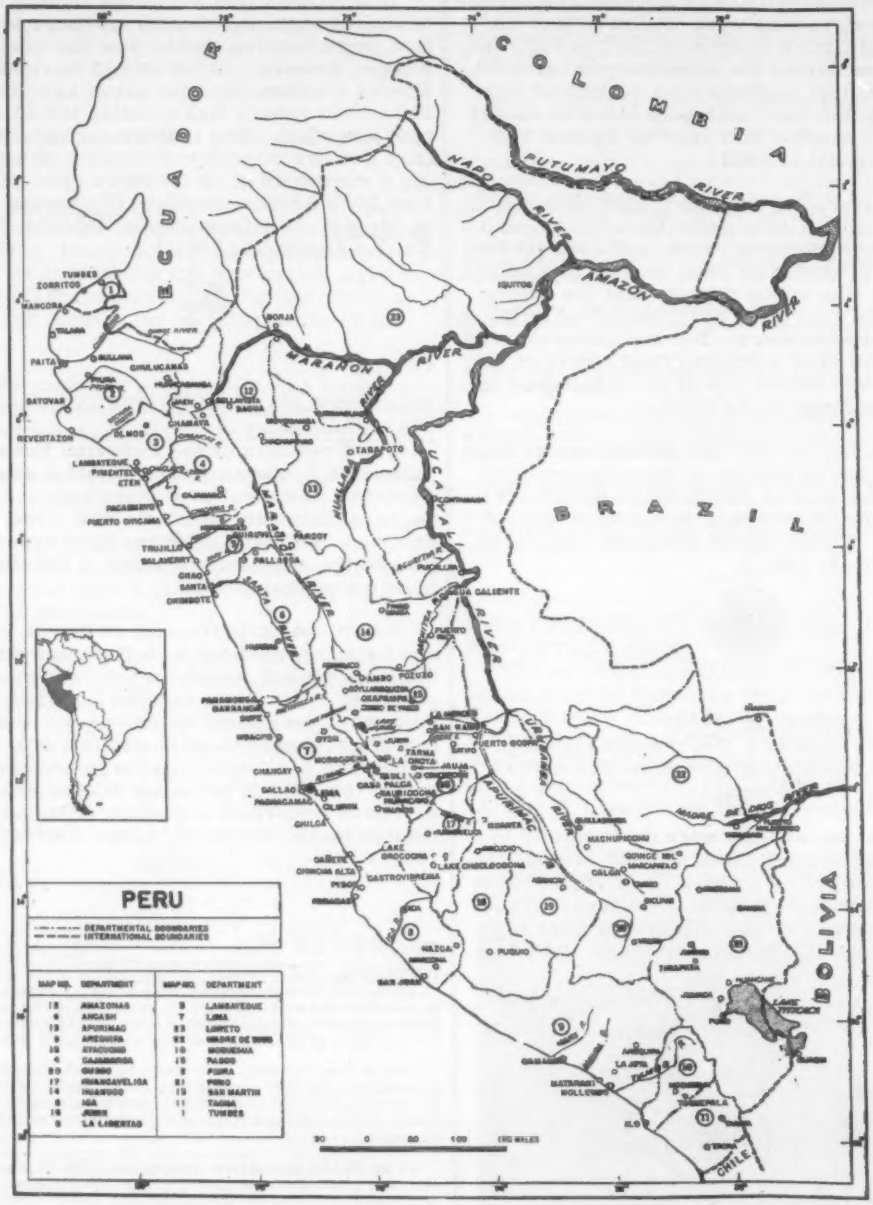
GROWTH OF THE FISHING INDUSTRY, 1955-1960:

From 1955 through 1960, landings of fish in Peru increased at a tremendous rate. Most of the catch was utilized in fish meal production, which increased more than 22 times from 1955 to 1960--from 25,000 metric tons to 560,000 tons.

Peru's domestic fish consumption for human food also increased sharply--139 percent from 1953 to 1960--from 30,500 tons to 73,000 tons. Higher prices for meat is the reason why the demand for fishery products in Peru has increased.

Of the 73,000 tons of fish consumed in 1960, 35 percent was used in the Lima area, according to the Peruvian Servicio de Pesqueria. This does not include 21,000 tons of dried salted fish destined principally for the Peruvian mountain villages, and 5,000 tons of canned fish. Another 500 tons of fishery products were consumed locally throughout Peru.

Peru (Contd.):


ECUADOR
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UCAYALI RIVER
URUBAMBA RIVER
MADRE DE DIOS RIVER
TUMBES
ZORRITOS
TALARA
PAITA
SULLANA
PIURA
CHULUCANAS
SECHURA
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HUANCABAMBA
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PIMENTEL
CHIMBOTE
TRUJILLO
SALAVERRY
PACASMAYO
PUERTO CHICAMA
CASMA
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SANTA
CHIMBOTE
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CERRO DE PASCO
HUANUCO
TINGO MARIA
TARAPOTO
YURIMAGUAS
IQUITOS
BORJA
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PUERTO GOODEN
PUERTO MALDONADO
LA OROYA
JAUJA
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CASA PALCA
HUANCAVELICA
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CHINCHA ALTA
CHILCA
CALLAO
LIMA
OLLANTAYTAMBO
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QUINCE MIL
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MATARANI
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17 HUANCAVELICA
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8 ICA
10 JUNIN
5 LA LIBERTAD
3 LAMBAYEQUE
7 LIMA
23 LORETO
22 MADRE DE DIOS
12 MOQUEGUA
15 PASCO
2 PIURA
21 PUNO
13 SAN MARTIN
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Peru (Contd.):

Table 1 - Peru's Exports of Principal Processed Fishery Products, 1960 1/

Product	Quantity	Value	
	Metric Tons	1,000 Soles	US$ 1,000
Fish:			
Frozen	18,129	54,797	2,048
Preserved 2/	15,423	154,713	5,782
Salted	345	662	25
Fish meal	507,042	1,056,443	39,478
Fish oil	35,008	99,163	371
Whale meal	2,783	4,696	175
Sperm oil	13,500	48,341	1,806
Total	592,230	1,418,815	49,685

1/Revised.
2/Not further identified, but believed to be mostly canned bonito.

Production of certain processed fishery products for calendar year 1960 was: frozen fish 18,000 metric tons, canned fish 1,700,000 cases, fish meal 550,000 metric tons, and fish oil 48,000 tons.

Table 2 - Peru's Fish Meal Production, 1955-1960

Year	1,000 Metric Tons
1960	560
1959	330
1958	125
1957	70
1956	30
1955	25

The 1960 production of fish meal was at a record high, exceeding 1959 by 230,000 metric tons, and about 3½ times the 1958 production.

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ANCHOVY LANDINGS
JANUARY-JUNE 1961 SET NEW RECORD:

During the first half of 1961, Peru's anchovy landings reached the new record of 2,325,148 metric tons or close to 5.1 billion pounds. Landings amounted to 1,500,544 tons in 1960 and 829,630 tons in 1959. Reasons for the increase were given as greater technical skill in fishing and the increased number of vessels engaged in anchovy fishing, the United States Embassy in Lima reported on September 28, 1961.

Philippine Republic

INLAND FISHING RESEARCH PROJECT:

Under the sponsorship of the United Nations, the Philippines has launched a five-year project aimed at collecting information on inland fishing. The site of the project is a barrio in Los Banos, Laguna, on the shores of Laguna de Bay. A team of fishery experts headed by a fishery technologist and assisted by an FAO fishery expert will undertake the following projects: (1) survey current and potential inland waters from the aspect of fish production; (2) test new scientific equipment; (3) study the life cycle of domestic fish; and (4) study water chemistry. The fishery team expects it will be able to make useful recommendations on expanding the Philippine inland fishing industry as the project progresses. (United States Embassy, Manila, October 19, 1961.)

Portugal

SARDINE FISHERY TRENDS:

According to figures recently released by the Sardine Fishing Guild, 31,420 metric tons of sardines were landed in Portugal during the first seven months of 1961 as compared with 28,137 tons in that period of 1960. Other species landed by the sardine fleet during the same 1961 period were: mackerel--705 tons (567 tons in 1960), anchovy--2,761 tons (2,550 tons in 1960), and chinchards--22,673 tons (16,174 tons in 1960).

On October 4, 1961, the Matosinhos sardine fleet landed a record total one-day catch of 73,000 cabazes (approximately 1,800 metric tons) of sardines valued at about 7,500 contos (US$262,500). The over-all fishing season compared very favorably with that of last year. Canning factories were kept active and exports were maintained. (Report from United States Embassy, Lisbon, October 12, 1961.)

Sierra Leone

FISHERIES LOAN AND CREDIT FUND:

The Government of Sierra Leone has established a Fisheries Loan and Credit Fund to be used for the following purposes: (1) the purchase of outboard motors and parts; (2) the conversion of canoes to take outboard motors; (3) the purchase of inboard engines and parts; (4) the purchase of improved fishing gear; (5) the purchase of materials for the construction of buildings for the fishing or fish preserving industry.

Sierra Leone (Contd.):

It is understood that the Government will limit these loans for the present to cooperatives only. (United States Embassy, Freetown, September 13, 1961.)

South Africa Republic

PILCHARD-MAASBANKER FISHERY INDUSTRY, JANUARY-JUNE 1961:

The Republic of South Africa Cape west coast pelagic shoal fishery catch for the first six months of the 1961 season totaled: pilchards 386,996 short tons, maasbanker 41,350 tons, and mackerel 45,726 tons. The total catch was 474,072 tons. In 1960 the total catch for the same period was: pilchards 261,666 tons, maasbanker 44,850 tons, and mackerel 28,353 tons; a grand total of 334,869 tons. In 1959 the total catch for the first six months was 221,646 tons.

The June catch was: pilchards 43,181 tons, maasbanker 11,439 tons, and mackerel 10 tons. The total June catch was 54,630 tons. In June 1960 the catch was: pilchards 50,141 tons, maasbanker 1,707 tons, and mackerel 80 tons; a grand total of 51,928 tons.

The June catch this year yielded: fish meal 12,402 tons, fish body oil 821,837 Imperial gallons, canned pilchards 1,206,228 pounds, canned maasbanker 3,820,152 pounds, and canned mackerel 9,144 pounds. (From The South African Shipping News and Fishing Industry Review, August 1961.)

Republic of South Africa--Products Produced from Pilchard-Maasbanker Fishery Landings, January-June 1961

Fish Meal	Fish Oil	Canned		
		Pilchards	Maasbanker	Mackerel
Short Tons	Imp. Gals.	..... (1,000 Lbs.)		
101,263	8,821	18,505	10,576	13,775

During June 1961 the Walvis Bay shoal fishing industry of South-West Africa caught: pilchards 67,940 tons. The total Walvis Bay catch to the end of June was 195,924 tons.

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INDIAN OCEAN RESEARCH:

South Africa's biggest fishery research vessel, the Africana II, in the autumn of 1961 left on a 40-day cruise as part of the 1960-64 Indian Ocean Project, designed to probe some of the mysteries of that ocean. This is the first of 3 South African vessels to join in this international operation in which more than 40 modern research vessels from 20 countries will take part.

During her 3,000-mile voyage, special fishing equipment was to be used to seek samples of plankton, young fish, bottom fish, and sharks. Efforts will also be made to catch tuna by the Japanese long-line method. (The Fishing News, September 8, 1961.)

Spain

VIGO FISHERIES TRENDS, THIRD QUARTER 1961:

Landings: The third quarter 1961 at Vigo, Spain, was favorable for landings of the most marketable industrial variety--sardines. Tuna landings rose from 553 tons in July to 2,165 tons in August. Over-all landings in Vigo in the third quarter were up 31 percent in quantity and 52 percent in value over the previous quarter, and were up 12 percent and 8 percent, respectively, as compared with the third quarter of 1960.

Table 1 - Vigo Fishery Landings, Third Quarter 1961 with Comparisons

Period	Quantity	Value	
	Metric Tons	1,000 Pesetas	US$1,000
July-September 1961	22,921	239,586	3,993
April-June 1961 . .	17,461	157,931	2,632
July-September 1960	20,425	221,343	3,689

The main species (sardines, horse mackerel, albacore, and small hake) comprised about 60 percent of the total landings in the third quarter 1961, with the balance made up

Table 2 - Vigo Landings of Principal Species and Average Ex-Vessel Prices, Third Quarter 1961 with Comparisons

Species	1961						1960		
	July-September			April-June			July-September		
	Quantity	Avg. Price		Quantity	Avg. Price		Quantity	Avg. Price	
	Metric Tons	Pesetas/Kilo	U.S. ¢/Lb.	Metric Tons	Pesetas/Kilo	U.S. ¢/Lb.	Metric Tons	Pesetas/Kilo	U.S. ¢/Lb.
Sardines . . .	5,093	5.30	4.0	1,411	5.20	3.9	3,619	4.39	3.3
Horse mackerel	3,334	2.70	2.0	2,391	2.71	2.1	2,779	3.72	2.8
Albacore . . .	3,078	22.56	17.1	188	23.04	17.5	3,351	17.30	13.1
Small hake . .	2,455	24.27	18.4	2,973	19.84	15.0	2,531	23.19	17.6

Spain (Contd.):

of more than 40 different species (table 2).

The shellfish season opened on October 1, with large catches of clams and cockles ("berberecho").

Fish Canning: The Galician fish-canning industry in the third quarter was at the height of production owing to the summer abundance of sardines and tuna (table 3). There was a steady demand for Spanish canned fish in the domestic and foreign markets. (United States Consulate, Vigo, October 18 and 25, 1961.)

Note: Values converted at rate of 60 pesetas equal US$1.

Table 3 - Utilization of Vigo Fishery Landings, Third Quarter 1961 with Comparisons

Period	Shipped Fresh to Domestic Markets	Canning	Other Processing (smoking, drying, fish meal, etc.)	Local Consumption
	(Metric Tons)			
July-September 1961	11,635	7,326	3,037	923
April-June 1961	10,948	1,302	4,440	771
July-September 1960	10,078	5,085	3,963	1,299

Sweden

TWO LARGEST FISH CANNERS PLAN MERGER:

The two largest canning companies in Sweden (one located in Goteborg and one in Stockholm) have made plans to amalgamate on January 1, 1962. The two organizations, which employ about 900 persons, are responsible for about 75 percent of Sweden's production of canned herring.

The two companies during the transition period will carry out their activities as hitherto but under a central management. The final decision about the amalgamation is subject to approval of the stockholders.

The Goteborg firm owns six canning plants located in Goteborg, Lysekil, Stromstad, Grebbestad, Gullholmen, and Hamburgsund, all on the Swedish west coast, as well as a canning plant for vegetables in Kristianstad.

The Stockholm firm owns three canning plants on the Swedish west coast, located at Gravarne, Vajern, and Bovallstrand. In addition, the company has facilities in Goteborg for the purpose of freezing certain products. (American Consul, Goteborg, Oct. 13, 1961.)

U. S. S. R.

FISHING OPERATIONS IN BERING SEA:

During the summer of 1961, Soviet fishing fleets operated in the eastern Bering Sea, especially along the 100-fathom curve west of northwest of the Pribilof Islands. Numerous modern Soviet fishing and associated vessels worked the fishing grounds on the shelf's edge. One fleet operating in Bristol Bay consisted of 6 refrigerator ships, 2 Pushkin-type stern trawlers, 26 medium (SRT) trawlers, and 1 small freighter. The bulk of the catch was apparently small gray flatfish (sole and flounder).

Soviet transport surrounded by factoryship and fishing vessels Bering Sea (April 1959).

Another Soviet fleet in Bristol Bay consisted of a crab factoryship, the Andrey Zakharov, and 12 small catcher boats. This large ship, estimated to be 540 feet in length and of 15,000 gross tons, was seen launching the catcher boats, each of which carried 8 to 10 crewmen. The king crab catch by the tangle nets appeared to be good. Other medium (SRT) trawlers were seen operating on the fringes of the fleets and may have been exploring the fishing grounds.

In deeper water, west of the 100-fathom line, red rockfish (redfish) were seen being

U. S. S. R. (Contd.):

transferred from an SRT trawler to a fleet refrigerator ship.

The Soviet fishing effort in the Bering Sea in 1961 evidently increased over 1960. But the fishing effort by the Soviet fleets continues to be less intense than that observed among the Japanese fleets. In 1960, the estimated Bering Sea catch of the U. S. S. R. was 300 million pounds and that of Japan 975 million pounds.

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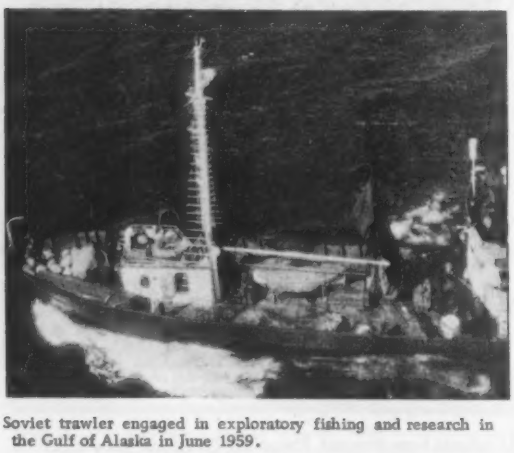
NORTHEASTERN PACIFIC FISHERY RESEARCH:

The U. S. S. R. is expanding its exploratory fishing in the Northeastern Pacific and the Gulf of Alaska. A trawler-research vessel, the Orlik, in mid-1961 reportedly left on a four-months expedition for the Soviet Pacific Ocean Institute for Fish Economy and Oceanography. Also, the freezer-trawler Ulyanovsk departed for redfish fishing grounds in the Northeastern Pacific where it was to be joined by another trawler, the Adler.



Soviet trawler engaged in exploratory fishing and research in the Gulf of Alaska in June 1959.

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NORTHWESTERN ATLANTIC FISHERIES:

In a speech titled "Basic Trends of the Technical Progress in Fish Industries," A. A. Ishkov, a member of the Council of Ministers of the U. S. S. R., made an important reference to fisheries in the Northwest Atlantic Ocean. After predicting a rise in Soviet per capita fish consumption from the current 9.5 to 9.7 kilograms (about 21 pounds) per year to 13.6 kilograms (30 pounds) in 1965, the Minister pointed out that the Northwest Atlantic is the principal region for Soviet expansion in the immediate future. (Rybnoe Khosiaistvo, Moscow, May 1961.)

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WHALE OIL SOLD TO WESTERN EUROPE:

The Soviet Union, a rapidly growing member of the world's family of whaling nations, made its first sales on the world whale oil market in 1960. Approximately one-third of its 1960 production of whale oil went to an international trading firm, presumably for resale to West Germany and the Netherlands, two large outlets for United States vegetable and fish oils. Russian whale oil production in 1960 was the equivalent of 2,782 blue whales, slightly below the U. S. S. R.'s quota for the year.

Currently, the Soviet Union imports large amounts of hardened marine oils from Norway; therefore, there was some surprise at the Russians exporting whale oil. In the future they are expected to consume most of their production domestically. (Foreign Agriculture, October 1961, U. S. Department of Agriculture.)

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MOTHERSHIP WITH ALMOST 4 MILLION POUNDS OF HERRING:

In a period of three months this year in the North Atlantic herring fishery, the Soviet mothership Iokhannes Vares processed 1,740 metric tons (3.8 million pounds) of herring and serviced 100 fishing vessels with supplies and technical assistance.

Of the processed catch, 4,000 11-pound containers consisted of "special salted herring." After a brief stay in port, the mothership sailed to the Newfoundland banks for the ocean perch fishery.

At the same time, a large freezer trawler, six medium trawlers, and six other vessels which had taken part in the herring fishery were ordered to Newfoundland without first going to port.

* * * * *

NORTH PACIFIC WHALING:

During the 1960 summer season, the U. S. S. R. operated four whale shore stations

U. S. S. R. (Contd.):

on the Kurile Islands and one whale factoryship off Kamchatka. The 13 catcher boats based at the shore stations caught 1,931 whales and the 9 catchers operating from the factoryship caught 2,472 whales. Most of the catches consisted of sperm whales. (Norsk Hvalfangst-Tidende, July 1961.)

* * * * *

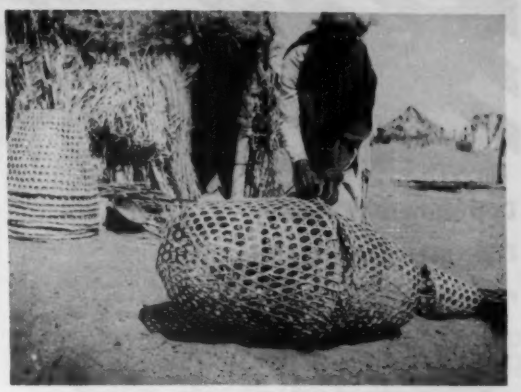
MARINE STUDIES CENTERED AT SEVASTOPOL:

The Marine Hydrophysical Institute will be transferred from Moscow to Sevastopol on the Black Sea. Already located at this port is the Marine Biological Institute, Ukrainian Academy of Sciences. (Current Review of the Soviet Technical Press, October 6, 1961.)

Yemen

FISHING INDUSTRY:

While Yemen has considerable potential for developing its Red Sea fishing resources, fishing today is still conducted on a small scale and in a primitive manner. Fish is an important feature of the diet for the inhabitants of coastal towns, and in areas around Hodeida, Mocha, and Salif where there is sufficient population to support fishermen, small fishing fleets are in operation. In addition to kingfish, red snapper, pompano, and other varieties of edible fish, shrimp in relatively large quantities, crab, and spiny lobster are found in the waters off the Yemeni coast. The fishermen currently devote their efforts almost exclusively to obtaining catches of fish. They are, nevertheless, familiar with the techniques required for catching shellfish and would no doubt fish for shrimp and crabs if a market existed for them.



Fishermen in Yemen making a fish trap from straw.

In addition to fishing for the Yemeni coastal market, Yemeni fishermen also catch and export a small fish ("wazeef") which appears to be a variety of sardine. Although the export industry has declined sharply in recent years, it still has a sound economic basis and could be revived. The Yemeni fishermen who catch "wazeef" operate from Mocha or Khawkha and fish in waters adjacent to these locales. While some of the fish are dried at Khawkha and sold throughout the southern Yemen, generally the fishermen take their catch either to Amran on the Protectorate coast or directly to Aden where the fish are dried and prepared for export. Consequently, Aden trade figures do not reflect the portion of the Aden fishing industry that is conducted by Yemeni boats in Yemeni waters. In 1959, the combined Aden-Yemen dried fish exports consisted of 2,575 metric tons valued at £183,965 (US$515,000). Ceylon which purchased 83 percent of Aden's dried fish provided the only significant market. (United States Legation, Taiz, October 9, 1961.)

HERRING REST IN DEEP WATER

Russian scientists utilized submarines to observe herring behavior in the Norwegian Sea in 1959. During the day, winter herring were restful--even motionless--in deep water, with heads down or upward, and even belly up. They rose toward evening and grew more and more agile through the night, reaching a peak of activity at dawn and then subsiding. The study is printed in Russian in Rybnoe Khoziaistvo 35(7), 1959.

FEDERAL ACTIONS

Department of Health, Education, and Welfare

FOOD AND DRUG ADMINISTRATION

USE OF SODIUM NITRITE IN SMOKED CURED TUNA AND SALMON PRODUCTS:

Sodium nitrite may be safely used in smoked cured tuna and salmon products in accordance with the prescribed conditions in the two orders issued by the U. S. Food and Drug Administration under section 409 of the Federal Food, Drug, and Cosmetic Act. The two orders published in the September 23, 1961, Federal Register became effective on publication.

For smoked cured salmon, sodium nitrite is to be used or intended for use alone or in combination with sodium nitrate as a preservative and color fixative so that the level of sodium nitrate does not exceed 500 parts per million (0.05 percent) and the level of sodium nitrite does not exceed 200 parts per million (0.02 percent) in the finished product.

For smoked cured tuna and smoked cured tuna products, sodium nitrite is to be used or intended for use alone or in combination with sodium nitrate as a color fixative so that the level of sodium nitrite does not exceed 10 parts per million in the finished product.

The orders were incorporated in the regulations under "Part 121--Food Additives, subpart D, sections 121.1063 and 121.1064."

* * * * *

USE OF SODIUM NITRITE IN CANNED PET FOOD CONTAINING FISH AND MEAT:

Sodium nitrite (as a color stabilizer and preservative) may be safely used in canned pet food containing meat and fish, according to an order issued by the U. S. Food and Drug Administration under section 409 of the Federal Food, Drug, and Cosmetic Act. The order was published in the September 23, 1961, Federal Register and became effective on publication. The additive is to be used or intended for use alone as a preservative and color fixative in canned pet food containing fish, meat, and fish and meat byproducts so that the level of sodium nitrite does not exceed 20 parts per million (0.002 percent).

The order was incorporated in the regulations under "Part 121--Food Additives, subpart C, section 121.223."

* * * * *

FOOD ADDITIVES ORDERS ON USE OF RED SEAWEED EXTRACTS IN FOODS:

On the use of the food additives carrageenan and salts of carrageenan and furcelleran and salts of furcelleran in food for human consumption, the U. S. Food and Drug Administration has issued two orders under the Federal Food, Drug, and Cosmetic Act as amended. The substances mentioned may be used safely as thickeners, emulsifiers, or stabilizers in food in accordance with the prescribed conditions in the regulations. Carrageenan is the refined hydrocolloid prepared by aqueous extraction from the following members of the families Gigartinaceae and Solieriaceae of the class Rodophyceae (red seaweed): Chondrus crispus, C. ocellatus, Eucheuma cottonii, E. spinosum, Gigartina acicularis, G. pistillata, G. radula, G. stellata. Salts of carrageenan consist of one or a mixture of two or more of the ammonium, calcium, potassium, or sodium salts of carrageenan. Furcelleran is the refined hydrocolloid prepared by aqueous extraction of Furcellaria fastigiata of the class Rodophyceae (red seaweed). The salts consist of one or a mixture of the ammonium, calcium, potassium, or sodium salts of furcelleran.

Both orders were published in the October 6, 1961, Federal Register, and became effective upon publication. The two sub-

stances were included under the regulations as "Part 121--Food Additives, Subpart D, sections 121.1066, 121.1067, 121.1068, and 121.1069."

Department of the Interior

BUREAU OF LAND MANAGEMENT

MINERAL LEASES IN NEW AREAS OF GULF OF MEXICO OUTER CONTINENTAL SHELF:

The minerals industry is being asked to nominate new areas for oil and gas leasing on the Outer Continental Shelf off Louisiana and Texas, Secretary of the Interior Stewart L. Udall announced on October 2, 1961. Secretary Udall said the nominations (which could be made until November 3) will be used by the Department in determining what areas will be opened to leasing through competitive bidding.

This is the first call for nominations on the oil-rich Outer Continental Shelf this year, said the Secretary. The last competitive oil and gas lease bid opening for the Gulf of Mexico area was held in February 1960.

The Secretary explained that nominated areas must be identified by leasing block numbers as shown on official leasing maps prepared by the Bureau of Land Management. In Louisiana each regular block contains 5,000 acres; and in Texas, 5,760 acres. Whole blocks or subdivisions may be nominated.

It is estimated that about 20 percent of this Nation's oil and gas reserves are on the Outer Continental Shelf. Last year nearly 36 million barrels of oil were produced from the Outer Continental Shelf and about 207 billion cubic feet of gas. There were about 500 oil and gas leases covering over 2 million acres.

The Bureau of Land Management notice was published in the Federal Register of September 30, 1961. After nominations have been received a complete description of all areas to be leased through competitive bidding will be published in the Federal Register.

U. S. Tariff Commission

HEARING ON PROPOSED FIRST SUPPLEMENTAL REPORT RELATING TO TARIFF CLASSIFICATION STUDY:

On November 20, 1961, a public hearing was held for the purpose of receiving the views of interested parties with respect to a proposed first supplemental report to accompany the Tariff Classification Study, issued on October 31, 1961.

The Tariff Classification Study was prepared pursuant to Title I of the Customs Simplification Act of 1954, as amended (Public Law 768, 83rd Congress; Public Law 934, 84th Congress), which directed the Commission to make a comprehensive study of the laws of the United States prescribing the tariff status of imported articles and to submit to the President and to the Chairmen of the Committee on Ways and Means of the House of Representatives and the Committee on Finance of the Senate a revision and consolidation of these laws which, in the judgment of the Commission, would, to the extent practicable--

(1) Establish schedules of tariff classifications which will be logical in arrangement and terminology and adapted to the changes which have occurred since 1930 in the character and importance of articles produced in and imported into the United States and in the markets in which they are sold.

(2) Eliminate anomalies and illogical results in the classification of articles.

(3) Simplify the determination and application of tariff classifications.

The results of this study, embodied in the Tariff Classification Study, were submitted on November 15, 1960, to the President and to the Chairmen of the Committee on Ways and Means of the House of Representatives and the Committee on Finance of the Senate.

Since that date, legislative modifications, court decisions, and administrative actions have occurred which affect a number of the provisions in the Tariff Classification Study. The Commission has also received suggestions from interested parties for changes in certain of the headnotes and tariff schedules contained in the Study, both in the form of direct submissions to the Commission and in the form of submissions to the Committee on Ways and Means of the House of Representatives in response to a press release of that Committee on August 15, 1961, calling for written comments from interested parties on the Tariff Classification Study.

The proposed supplemental report contains an explanation of the changes in the headnotes and tariff schedules of the Tariff Classification Study which, in the judgment of the Commission, are necessary to bring them up to date, to correct error, or to further the objectives of the Study, as well as a statement of the reasons for not accepting certain of the suggestions received from interested parties.

Note: See Commercial Fisheries Review, November 1960 p. 93.

Department of the Treasury

COAST GUARD

AMENDED VESSEL INSPECTION REGULATIONS ISSUED:

Amended vessel inspection regulations have been issued by the U. S. Coast Guard. Part II of the September 30, 1961, issue of the Federal Register is devoted to miscellaneous amendments of the regulations. The amendments to the regulations are covered under "Title 46--Shipping."

While fishing vessels are not specifically mentioned, some of the amendments may apply to larger fishing vessels.

Eighty-Seventh Congress

(First Session)

Public bills and resolutions which may directly or indirectly affect fisheries and allied industries are reported. Introduction,

referral to committees, pertinent legislative actions, hearings, and other actions by

the House and Senate, as well as signature into law or other final disposition are covered.

EXPORT POLICY ACT OF 1961: Promotion of United States Exports (August 30, 1961, Hearing before Subcommittee No. 3, of the Committee on Banking and Currency, House of Representatives, 87th Congress, 1st Session on H. R. 8381, Amend Export-Import Bank Act, 1945; H. R. 7102 and H. R. 7103, Create American Export Credits Guaranty Corporation; and H. R. 7266 and H. R. 8249, National Export Policy Act, 1961), 160 pp., printed. Contains text of each bill, statements by officials of the Export-Import Bank, Bank of America, Bank of America International, and a Senator. To correct problem of the imbalance of international payments and outflow of gold to other countries, credit would be extended to purchasers abroad by Export-Import Bank, among others, and would be guaranteed by the Federal Government.

FOREIGN ECONOMIC POLICY: A New Look at Foreign Economic Policy in Light of the Cold War and the Extension of the Common Market in Europe (October 23, 1961, Report of Christian A. Herter and William L. Clayton, prepared at request of the Subcommittee on Foreign Economic Policy of the Joint Economic Committee of the Congress), 16 pp., printed.

The authors point out that 27 years ago, with the enactment of the Trade Agreements Act, the United States committed itself to a liberal foreign economic policy. In 1962 it must be renewed again. Further, they state: "We believe that the United States must form a trade partnership with the European Common Market and take the leadership in further expanding a free world economic community. As a minimum step in that direction, the Trade Agreements Act must give the President authority to negotiate tariff reduction across the board in place of his present authority to negotiate item by item. Our allies in Europe are no longer dealing in item-by-item terms, and we must adapt our negotiating authority accordingly."

IMPORT COMPETITION ADJUSTMENT: Congressman John H. Dent, Chairman of the House Subcommittee on the Impact of Imports and Exports on American Employment, held hearings in Washington, D. C., November 27-28-29-30 and December 1, 4-5, 1961. The hearings covered a number of industries, including the fishing industry. Many industries were given an opportunity to express their views before that date. These hearings covered all aspects of the foreign trade movement insofar as it is related to employment in any area of the country or any segment of the economy.

POLLUTION OF THE SEA TREATY IMPLEMENTATION: Wetlands Acquisition and Oil Pollution of the Sea (July 31, 1961, Hearing before the Merchant Marine and Fisheries Subcommittee of the Committee on Commerce, United States Senate, 87th Congress, 1st Session on S. 2187, a bill to implement the provisions of the International Convention for the Prevention of the Pollution of the Sea by Oil, 1954; and S. 2175 and H. R. 7391, bills to promote the conservation of migratory waterfowl by the acquisition of wetlands and other essential waterfowl habitat, and for other purposes), 40 pp., printed. Contains text of each bill; statements of various government officials, Senators, wildlife conservation institutes and leagues; letters from various State wildlife and fish commissions, Senators, and government officials; and reports from the Bureau of the Budget, Comptroller General of the United States, Departments of Agriculture, Interior and Justice.

PACKAGING AND LABELING PRACTICES: On October 25, 26, and 27, Senator Hart (Mich.), of the Antitrust and Monopoly Subcommittee, of the Senate Committee on Judiciary, conducted public hearings on packaging and labeling practices affecting consumers. Witnesses included trade association representatives, container manufacturers, retailers both large and small, designers, researchers, and wholesalers. Senator Hart stated: "The efforts taken by industry. . . to meet some of the practices developed at the first hearings (June 28, 29, and 30), are very encouraging. It demonstrates that segments of the food industry at least are aware of the problems facing the consumer in shopping wisely and are interested in making progress in meeting consumer complaints."

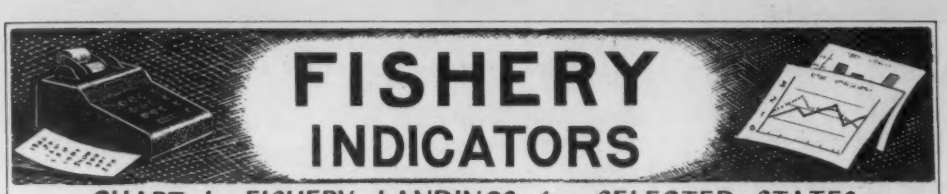
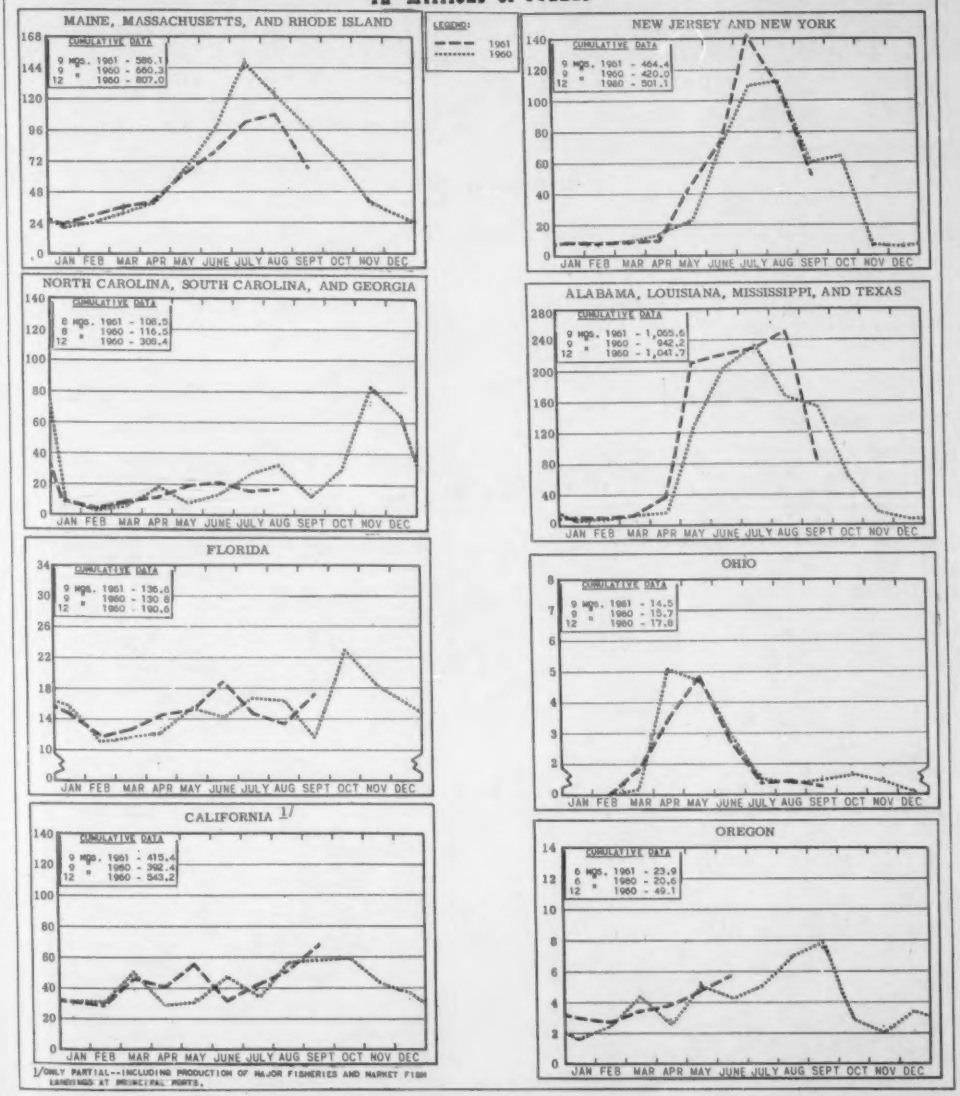


CHART 1 - FISHERY LANDINGS for SELECTED STATES

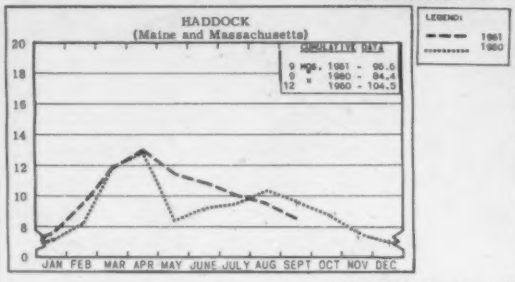
In Millions of Pounds

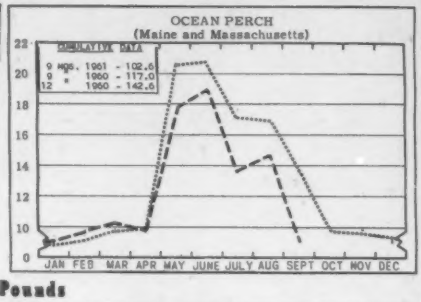

MAINE, MASSACHUSETTS, AND RHODE ISLAND
CUMULATIVE DATA
9 MOS. 1961 - 586.1
9 " 1960 - 660.3
12 " 1960 - 807.0
LEGEND:
1961
1960
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
NEW JERSEY AND NEW YORK
CUMULATIVE DATA
9 MOS. 1961 - 464.4
9 " 1960 - 420.0
12 " 1960 - 501.1
NORTH CAROLINA, SOUTH CAROLINA, AND GEORGIA
CUMULATIVE DATA
8 MOS. 1961 - 108.5
8 " 1960 - 116.5
12 " 1960 - 309.4
ALABAMA, LOUISIANA, MISSISSIPPI, AND TEXAS
CUMULATIVE DATA
9 MOS. 1961 - 1,055.6
9 " 1960 - 942.2
12 " 1960 - 1,041.7
FLORIDA
CUMULATIVE DATA
9 MOS. 1961 - 136.6
9 " 1960 - 130.8
12 " 1960 - 190.6
OHIO
CUMULATIVE DATA
9 MOS. 1961 - 14.5
9 " 1960 - 15.7
12 " 1960 - 17.8
CALIFORNIA 1/
CUMULATIVE DATA
9 MOS. 1961 - 415.4
9 " 1960 - 392.4
12 " 1960 - 543.2
OREGON
CUMULATIVE DATA
6 MOS. 1961 - 23.9
6 " 1960 - 20.6
12 " 1960 - 49.1

1/ONLY PARTIAL--INCLUDING PRODUCTION OF MAJOR FISHERIES AND MARKET FISH LANDINGS AT PRINCIPAL PORTS.

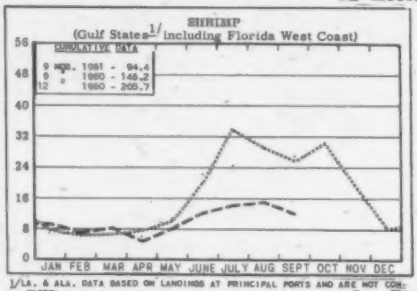
CHART 2 - LANDINGS for SELECTED FISHERIES

In Millions of Pounds

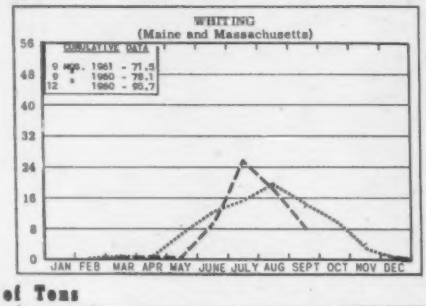



OCEAN PERCH
(Maine and Massachusetts)
CUMULATIVE DATA
9 MOS. 1961 - 102.6
9 " 1960 - 117.0
12 " 1960 - 142.6
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

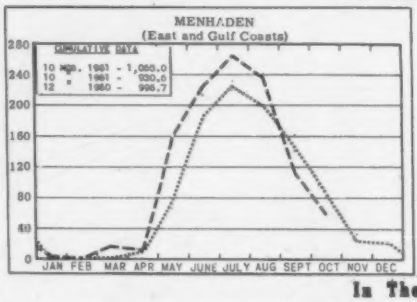
In Millions of Pounds

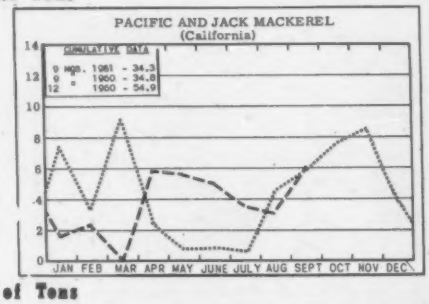

SHRIMP
(Gulf States 1/ including Florida West Coast)
CUMULATIVE DATA
9 MOS. 1961 - 94.4
9 " 1960 - 148.2
12 " 1960 - 205.7
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

1/LA. & ALA. DATA BASED ON LANDINGS AT PRINCIPAL PORTS AND ARE NOT COMPLETE.

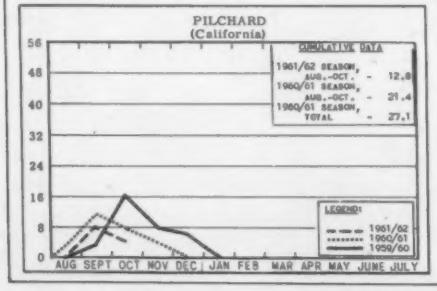

WHITING
(Maine and Massachusetts)
CUMULATIVE DATA
9 MOS. 1961 - 71.5
9 " 1960 - 78.1
12 " 1960 - 95.7
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

In Thousands of Tons


MENHADEN
(East and Gulf Coasts)
CUMULATIVE DATA
10 MOS. 1961 - 1,065.0
10 " 1961 - 930.6
12 " 1960 - 998.7
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC


PACIFIC AND JACK MACKEREL
(California)
CUMULATIVE DATA
9 MOS. 1961 - 34.3
9 " 1960 - 34.8
12 " 1960 - 54.9
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

In Thousands of Tons



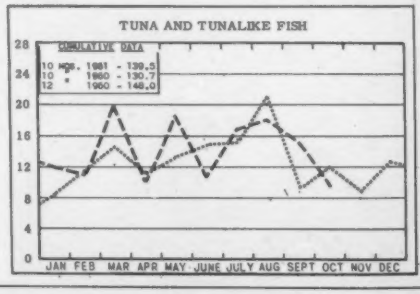
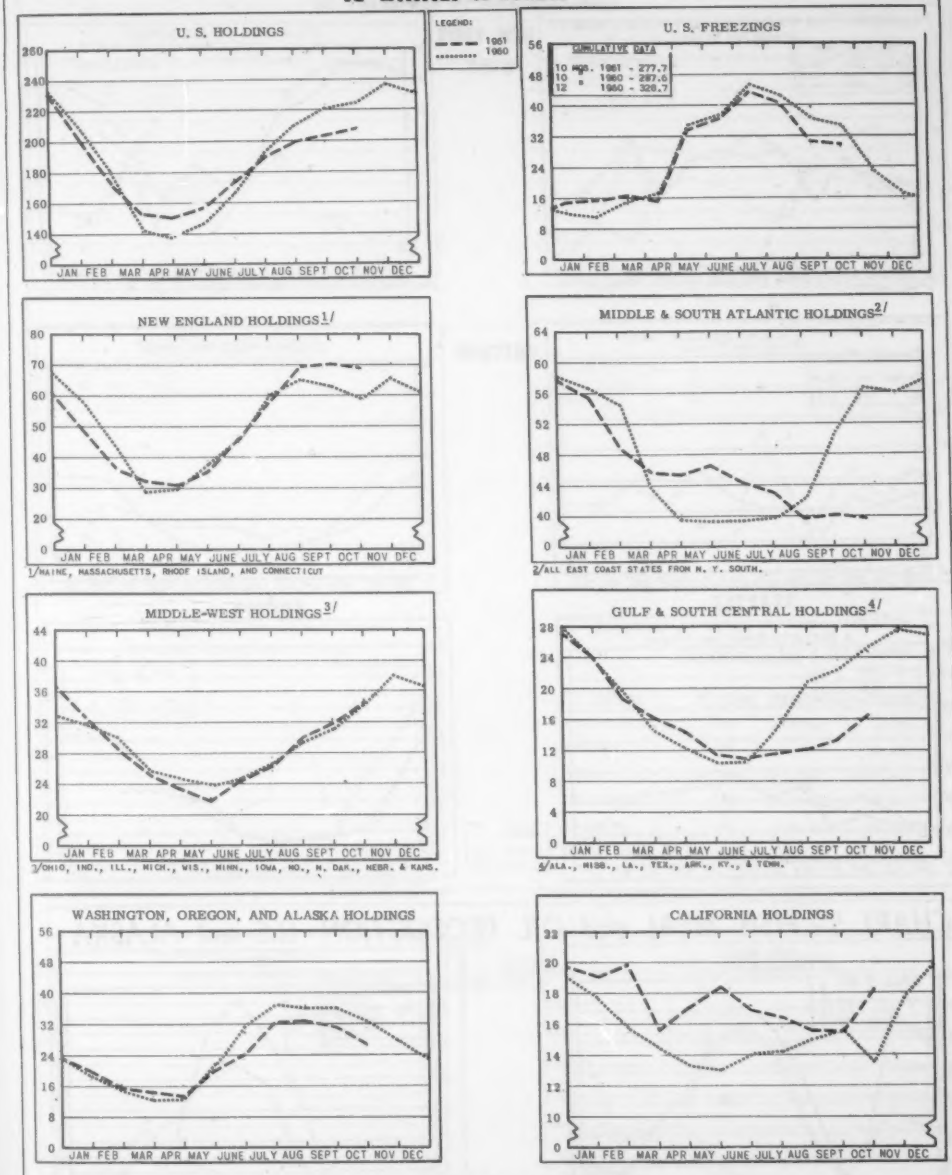

TUNA AND TUNALIKE FISH
CUMULATIVE DATA
10 MOS. 1961 - 139.5
10 " 1960 - 130.7
12 " 1960 - 148.0
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS *

In Millions of Pounds


U. S. HOLDINGS
LEGEND:
1961
1960
U. S. FREEZINGS
CUMULATIVE DATA
10 MOS. 1961 - 277.7
10 " 1960 - 287.6
12 " 1960 - 328.7
NEW ENGLAND HOLDINGS 1/
MIDDLE & SOUTH ATLANTIC HOLDINGS 2/
MIDDLE-WEST HOLDINGS 3/
GULF & SOUTH CENTRAL HOLDINGS 4/
WASHINGTON, OREGON, AND ALASKA HOLDINGS
CALIFORNIA HOLDINGS
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

1/ MAINE, MASSACHUSETTS, RHODE ISLAND, AND CONNECTICUT

2/ ALL EAST COAST STATES FROM N. Y. SOUTH.

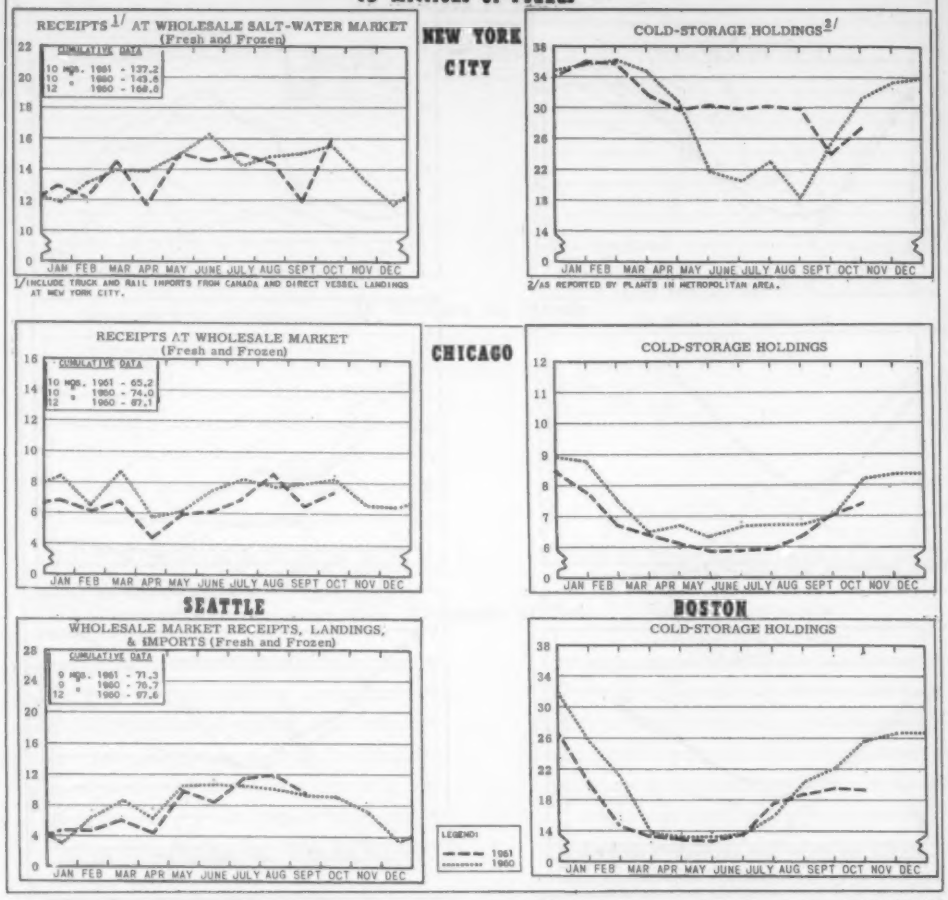
3/ OHIO, IND., ILL., MICH., WIS., MINN., IOWA, MO., N. DAK., NEBR. & KANS.

4/ ALA., MISS., LA., TEX., ARK., KY., & TENN.

* Excludes salted, cured, and smoked products.

CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS

In Millions of Pounds


RECEIPTS 1/ AT WHOLESALE SALT-WATER MARKET
(Fresh and Frozen)
CUMULATIVE DATA
10 MOS. 1961 - 137.2
10 " 1960 - 143.6
12 " 1960 - 168.0
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
NEW YORK CITY
COLD-STORAGE HOLDINGS 2/
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
RECEIPTS AT WHOLESALE MARKET
(Fresh and Frozen)
CUMULATIVE DATA
10 MOS. 1961 - 65.2
10 " 1960 - 74.0
12 " 1960 - 97.1
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
CHICAGO
COLD-STORAGE HOLDINGS
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
SEATTLE
WHOLESALE MARKET RECEIPTS, LANDINGS,
& IMPORTS (Fresh and Frozen)
CUMULATIVE DATA
9 MOS. 1961 - 71.3
9 " 1960 - 76.7
12 " 1960 - 97.6
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
BOSTON
COLD-STORAGE HOLDINGS
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
LEGEND:
1961
1960

1/INCLUDE TRUCK AND RAIL IMPORTS FROM CANADA AND DIRECT VESSEL LANDINGS AT NEW YORK CITY.

2/AS REPORTED BY PLANTS IN METROPOLITAN AREA.

CHART 5 - FISH MEAL and OIL PRODUCTION - U.S and ALASKA

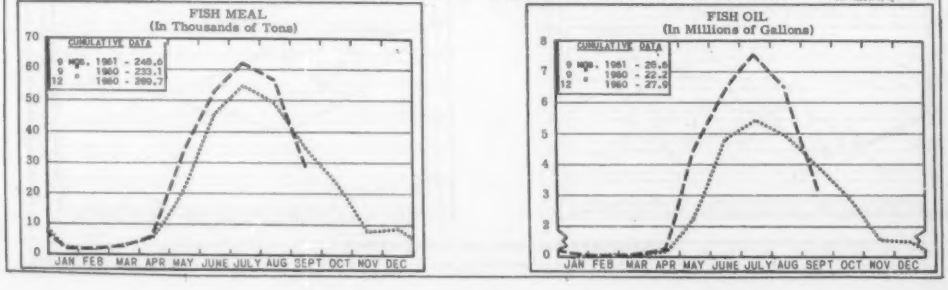
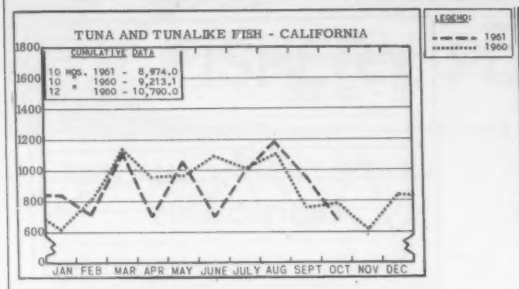
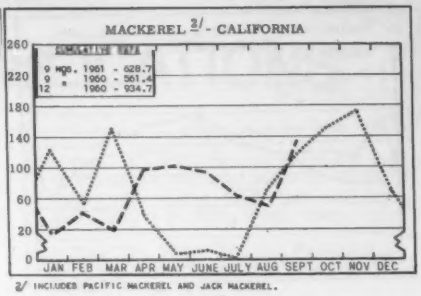

FISH MEAL
(In Thousands of Tons)
CUMULATIVE DATA
9 MOS. 1961 - 248.6
9 " 1960 - 233.1
12 " 1960 - 289.7
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
FISH OIL
(In Millions of Gallons)
CUMULATIVE DATA
9 MOS. 1961 - 28.6
9 " 1960 - 22.2
12 " 1960 - 27.9
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

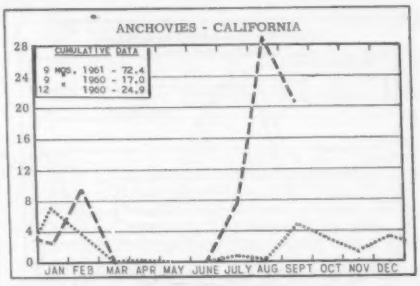
CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

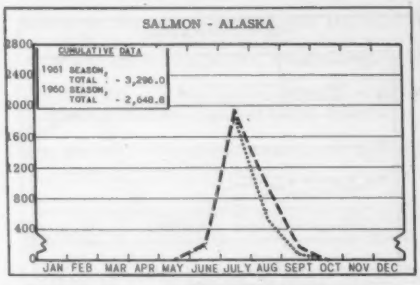
In Thousands of Standard Cases

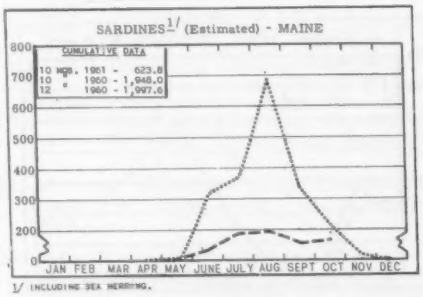

TUNA AND TUNALIKE FISH - CALIFORNIA
CUMULATIVE DATA
10 MOS. 1961 - 8,974.0
10 " 1960 - 9,213.1
12 " 1960 - 10,790.0
LEGEND:
1961
1960
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC


MACKEREL 2/ - CALIFORNIA
CUMULATIVE DATA
9 MOS. 1961 - 628.7
9 " 1960 - 561.4
12 " 1960 - 934.7
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

2/ INCLUDES PACIFIC MACKEREL AND JACK MACKEREL.


ANCHOVIES - CALIFORNIA
CUMULATIVE DATA
9 MOS. 1961 - 72.4
9 " 1960 - 17.0
12 " 1960 - 24.9
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

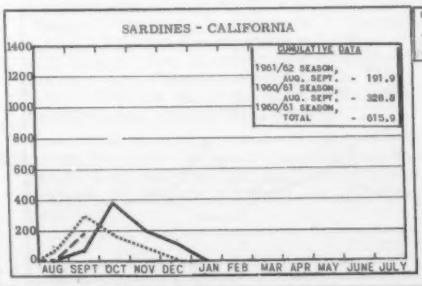

SALMON - ALASKA
CUMULATIVE DATA
1961 SEASON, TOTAL - 3,296.0
1960 SEASON, TOTAL - 2,648.8
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC


SARDINES 1/ (Estimated) - MAINE
CUMULATIVE DATA
10 MOS. 1961 - 623.8
10 " 1960 - 1,948.0
12 " 1960 - 1,997.6
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

1/ INCLUDING SEA HERRING.

STANDARD CASES

Variety	No. Cans	Designation	Net Wgt.
SARDINES.....	100	¼ drawn	3¾ oz.
SHRIMP.....	48	--	5 oz.
TUNA.....	48	# ½ tuna	6 & 7 oz.
PILCHARDS...	48	# 1 oval	15 oz.
SALMON.....	48	1-lb. tall	16 oz.
ANCHOVIES...	48	½-lb.	8 oz.



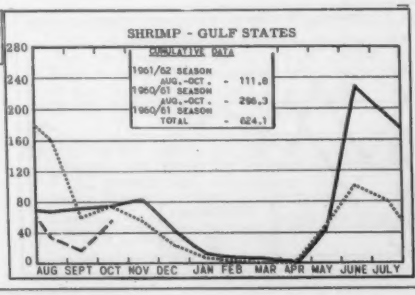
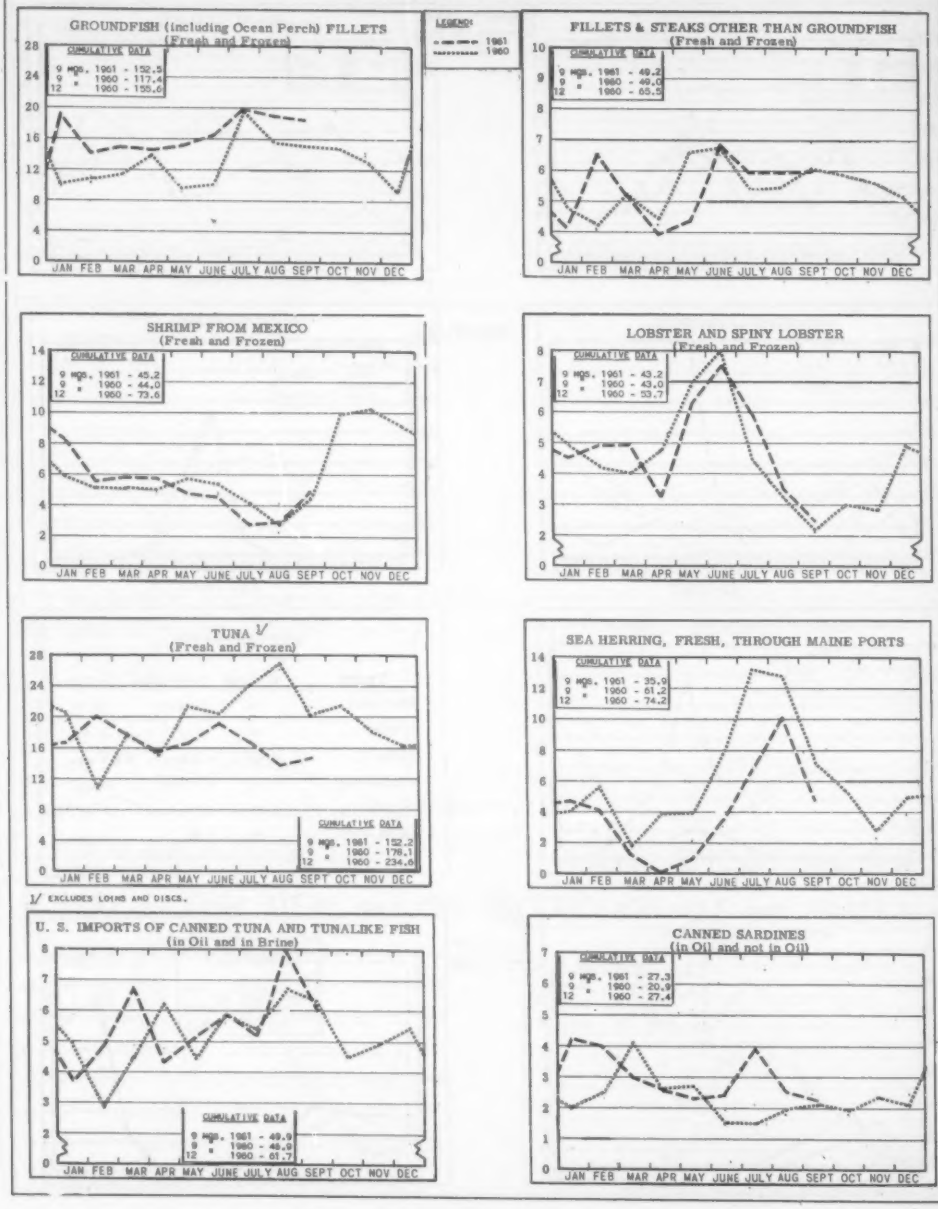

SHRIMP - GULF STATES
CUMULATIVE DATA
1961/62 SEASON AUG.-OCT. - 111.8
1960/61 SEASON AUG.-OCT. - 296.3
1960/61 SEASON TOTAL - 624.1
AUG SEPT OCT NOV DEC JAN FEB MAR APR MAY JUNE JULY

CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

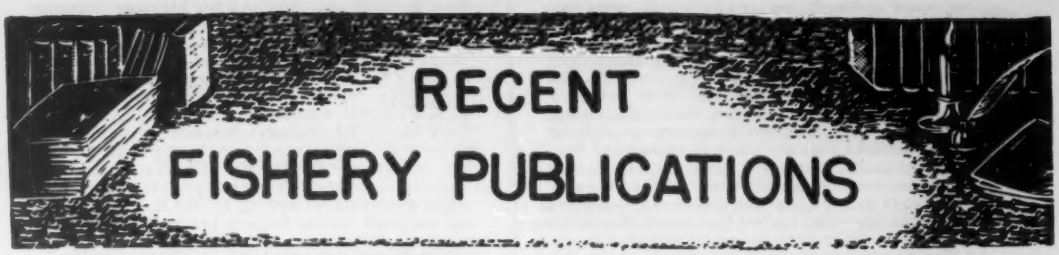
In Millions of Pounds


GROUNDFISH (including Ocean Perch) FILLETS
(Fresh and Frozen)
CUMULATIVE DATA
9 MOS. 1961 - 152.5
9 " 1960 - 117.4
12 " 1960 - 155.6
LEGEND:
1961
1960
FILLETS & STEAKS OTHER THAN GROUNDFISH
(Fresh and Frozen)
CUMULATIVE DATA
9 MOS. 1961 - 49.2
9 " 1960 - 49.0
12 " 1960 - 65.5
SHRIMP FROM MEXICO
(Fresh and Frozen)
CUMULATIVE DATA
9 MOS. 1961 - 45.2
9 " 1960 - 44.0
12 " 1960 - 73.6
LOBSTER AND SPINY LOBSTER
(Fresh and Frozen)
CUMULATIVE DATA
9 MOS. 1961 - 43.2
9 " 1960 - 43.0
12 " 1960 - 53.7
TUNA 1/
(Fresh and Frozen)
CUMULATIVE DATA
9 MOS. 1961 - 152.2
9 " 1960 - 176.1
12 " 1960 - 234.6
SEA HERRING, FRESH, THROUGH MAINE PORTS
CUMULATIVE DATA
9 MOS. 1961 - 35.9
9 " 1960 - 61.2
12 " 1960 - 74.2
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

1/ EXCLUDES LOINS AND DISCS.

U. S. IMPORTS OF CANNED TUNA AND TUNALIKE FISH
(in Oil and in Brine)
CUMULATIVE DATA
9 MOS. 1961 - 49.9
9 " 1960 - 48.9
12 " 1960 - 61.7
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

CANNED SARDINES
(in Oil and not in Oil)
CUMULATIVE DATA
9 MOS. 1961 - 27.3
9 " 1960 - 20.9
12 " 1960 - 27.4
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC



FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES.
FL - FISHERY LEAFLETS.
MNL - REPRINTS OF REPORTS ON FOREIGN FISHERIES.
SSR.- FISH. - SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).
SEP.- SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

Number	Title
CFS-2669	Massachusetts Landings, May 1961, 5 pp.
CFS-2675	Maine Landings, July 1961, 4 pp.
CFS-2676	Frozen Fish Report, August 1961, 8 pp.
CFS-2677	California Landings, May 1961, 4 pp.
CFS-2678	Shrimp Landings, April 1961, 6 pp.
CFS-2682	Mississippi Landings, June 1961, 2 pp.
CFS-2683	Virginia Landings, July 1961, 4 pp.
CFS-2684	Minnesota Landings, July 1961, 2 pp.
CFS-2686	Ohio Landings, July 1961, 2 pp.
CFS-2687	Louisiana Landings, February 1961, 2 pp.
CFS-2689	New York Landings, July 1961, 5 pp.
CFS-2690	Mississippi Landings, July 1961, 2 pp.
CFS-2691	Louisiana Landings, March 1961, 2 pp.
CFS-2692	Rhode Island Landings, June 1961, 3 pp.
CFS-2693	Rhode Island Landings, July 1961, 3 pp.
CFS-2696	North Carolina Landings, August 1961, 4 pp.

FL-293 - List of Fishermen's and Fish Shore Workers' Unions in the United States, 8 pp., revised August 1961.

FL-452 - Fishery Motion Pictures, 22 pp., illus., revised July 1961. Lists the Bureau of Commercial Fisheries films and explains how to borrow them and from whom. Currently available films are, "Sponge--Treasure from the Sea," "Salmon--Catch to Can," "Take a Can of Salmon," "Fish Cookery with Savoir," and "Outdoor Fish Cookery." Also available are, "Sardines from Maine, Down East Style," "It's the Maine Sardine," "Shrimp Tips from New Orleans," and several others.

SSR-Fish. No. 379 - Stomach Content Analysis of Troll-Caught King and Coho Salmon, Southeastern Alaska, 1957-58, by Gerald M. Reid, 10 pp., illus., July 1961.

SSR-Fish. No. 383 - Second Survey of the Occurrence of Parasites and Blemishes in Pacific Ocean Perch, Sebastodes alutus, May-June 1959, by John Liston and Charles R. Hitz, 9 pp., illus., July 1961.

SSR-Fish. No. 384 - Graphic Presentation of Pacific Sardine Age Composition Data, by Robert S. Wolf, 35 pp., illus., July 1961.

SSR-Fish. No. 387 - Downstream Movement of Lampreys and Fishes in the Carp Lake River, Michigan, by Vernon C. Applegate, 75 pp., August 1961.

Sep. No. 631 - Investigation of the Potential Albacore Resource of the Central North Pacific.

Sep. No. 632 - Financial Assistance to Fishing Industries in Various Countries.

THE FOLLOWING MARKET NEWS LEAFLETS ARE AVAILABLE FROM THE BRANCH OF MARKET NEWS, BUREAU OF COMMERCIAL FISHERIES, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C.

Number	Title
MNL-59	Survey of Shrimp Potential in Southern Brazil, 1961, 16 pp.
MNL-58	Republic of Korea's Fishing Industry, 1960, 4 pp.
MNL-44	Icelandic Fisheries, 1960, 14 pp.
MNL-60	Netherlands' Fisheries, 1960, 16 pp.

THE FOLLOWING ENGLISH TRANSLATIONS OF FOREIGN LANGUAGE ARTICLES ARE AVAILABLE ONLY FROM THE U. S. FISH AND WILDLIFE SERVICE, BUREAU OF COMMERCIAL FISHERIES, P. O. BOX 3830, HONOLULU, HAWAII.

On the Interrelationship Between Bluefin Tuna and Coastal Fishes, by Takeyuki Doi, 8 pp., illus., processed, August 1961. (Translated from Japanese, Bulletin of the Japanese Society of Scientific Fisheries, vol. 26, no. 2, 1960, pp. 99-102.)

On the Structure of Yellowfin Tuna Schools as Seen from the Distribution of the Catch on the Tuna Long-line, by Nobuo Hirayama, 4 pp., illus., processed, August 1961. (Translated from Japanese, Bulletin of the Japanese Society of Scientific Fisheries, vol. 23, no. 7/8, 1957, pp. 373-375.)

Studies on the Eggs, Larvae, and Juvenile of Japanese Fishes, Series I, by Keitaro Uchida and others, 8 pp., processed, September 1961. (Translated from Japanese, extracts of Studies on the Eggs, Larvae, and Juvenile of Japanese Fishes, Series I, 1958, pp. 26-27, 30-31, 65.)

THE FOLLOWING PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED:

California Fishery Market News Monthly Summary, Part I - Fishery Products Production and Market Data, August 1961, 16 pp. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif.) California cannery receipts of tuna and tunalike fish and other species used for canning; pack of canned tuna, tunalike fish, mackerel, and anchovies; market fish receipts at San Pedro, Santa Monica, and Eureka areas; California and Arizona imports; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; Oregon and Washington receipts (domestic and imports) of fresh and frozen tuna and tunalike fish; for the month indicated.

(Chicago) Monthly Summary of Chicago's Wholesale Market Fresh and Frozen Fishery Products Receipts, Prices, and Trends, September 1961 (Great Lakes Edition), 20 pp. (Market News Service, U. S. Fish and Wildlife Service, 565 W. Washington St., Chicago 6, Ill.) Receipts at Chicago by species and by states and provinces for fresh- and salt-water fish and shellfish; and weekly wholesale prices for fresh and frozen fishery products; for the month indicated. A review of Great Lakes commercial fish landings for 1960 and part of 1961 with trends, developments, and highlights, is featured in this issue.

Gulf of Mexico Monthly Landings, Production and Shipments of Fishery Products, August 1961, 8 pp. (Market News Service, U. S. Fish and Wildlife Service, Rm. 609, 600 South St., New Orleans 12, La.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; wholesale prices of fish and shellfish on the New Orleans French Market; fishery imports at Port Isabel and Brownsville, Texas, from Mexico; and sponge sales; for the month indicated.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, September 1961, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 18 S. King St., Hampton, Va.) Landings of food fish and shellfish and production of crab meat and shucked oysters for the Virginia areas of Hampton Roads, Chincoteague, Lower Northern Neck, and Lower Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data on fishery products and shrimp production; for the month indicated.

New England Fisheries--Monthly Summary, August 1961, 22 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston 10, Mass.) Review of the principal New England fishery ports. Presents data on fishery landings by ports and species; industrial-fish landings and ex-vessel prices; imports; cold-storage stocks of fishery products in New England warehouses; fishery landings and ex-vessel prices for ports in Massachusetts (Boston, Gloucester, New Bedford, Provincetown, and Woods Hole), Maine (Portland and Rockland), Rhode Island (Point Judith), and Connecticut (Stonington); frozen fishery products prices to primary wholesalers at Boston, Gloucester, and New Bedford; and Boston Fish Pier and Atlantic Avenue fishery landings and ex-vessel prices by species; for the month indicated.

New York City's Wholesale Fishery Trade--Monthly Summary--July 1961, 18 pp. (Market News Service, U. S. Fish and Wildlife Service, 155 John St., New York 38, N. Y.) Includes summaries and analyses of receipts and prices on wholesale Fulton Fish Market, including both the salt- and fresh-water sections; imports entered at New York customs district; primary wholesalers' selling prices for fresh, frozen, and selected canned fishery products; marketing trends; and landings at Fulton Fish Market docks and Stonington, Conn.; for the month indicated.

(Seattle) Washington and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, September 1961, 9 pp. (Market News Service, U. S. Fish and Wildlife Service, 706 Federal Office Bldg., 909 First Ave., Seattle 4, Wash.) Includes Seattle's landings by the halibut and salmon fleets reported through the exchanges; landings of halibut reported by the International Pacific Halibut Commission; landings of otter-trawl receipts reported by the Fishermen's Marketing Association of Washington; local landings by independent vessels; coastwise shipments from Alaska by scheduled and non-scheduled shipping lines and airways; imports from British Columbia via rail, motor truck, shipping lines, and ex-vessel landings; and imports from other countries through Washington customs district; for the month indicated.

Treatment of Cultch to Collect Heavier Sets of Oysters, by V. L. Loosanoff, Bulletin No. 8, vol. 25, 6 pp., illus., processed. (U. S. Fish and Wildlife Service, Bureau of Commercial Fisheries, Biological Laboratory, Milford, Conn., October 3, 1961.) A report on treatment of cultch to increase the sets of oysters in Long Island Sound. Studies showed that relatively poor production of seed oysters in Connecticut waters is due principally to light setting, fouling of cultch, and poor survival of set. Extensive experiments demonstrated that oyster shells used as cultch, if treated with certain chemicals, overcame some of the difficulties, especially fouling by marine organisms.

THE FOLLOWING SERVICE PUBLICATIONS ARE FOR SALE AND ARE AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, WASHINGTON 25, D. C.

Age Composition of the Pacific Sardine, 1932-1960, by Robert S. Wolf, Research Report 53, 39 pp., illus., printed, 20 cents, 1961.

1960 National Survey of Fishing and Hunting, Circular 120, 77 pp., illus., printed, 50 cents, September 1961 The second nationwide economic survey of sport fishing and hunting in the United States. A detailed study of participation in these sports, including types of fishing and hunting, expenditures, mileage traveled, and similar topics; was made of the more active sport fishermen and hunters. This study revealed an estimated 30 million sport fishermen or hunters in 1960, about 23 percent of the population 12 years old and over. These people reported around 650 million recreation days of fishing and hunting and an expenditure of close to 4 billion dollars. As compared with a similar survey in 1955, the number of sportsmen had increased by over 5 million and their expenditures by 1 billion dollars. In 1960, 3 billion dollars were spent on fishing, as

compared with 1.9 billion dollars in 1955. The remainder of this report is confined to the results of the detailed study with appropriate comparisons with the 1955 results. An attractively illustrated and easy-to-read booklet.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATIONS OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

ALABAMA:

"Some Interesting Records of Marine Fishes from Alabama," by H. T. Boschung, Jr., article, Journal of Alabama Academy of Science, article, vol. 29, 1957, pp. 33-34, printed. Medical College of Alabama, Birmingham, Ala.

ANADROMOUS FISH:

"Anadromous Fish Conservation in a Swedish Salmon River," by Arne Lindroth, Seventh Technical Meeting, International Union for Conservation of Nature and Natural Resources, Theme I, vol. IV, 1960, pp. 308-315, printed. International Union for Conservation, 2144 P St. NW., Washington 6, D. C.

ANCHOVIES:

"Generalidades sobre a Fabricacao dos Filetes de Anchova em Azeite, em Espanha" (Report on the Processing of Canned Anchovy Fillets in Oil in Spain), by Emilio Rodriguez Alonso, article, Conservas de Peixe, vol. 16, no. 184, July 1961, pp. 15, 22, printed in Portuguese. Conservas de Peixe, Sociedade Astoria, Lda., Regueirao dos Anjos, 68, Lisbon, Portugal.

AQUATIC RESOURCES:

"The Effect of Various Conservational Measures or Works on the Aquatic Environment and on the Stocks of that Environment," by P. A. Larkin, Seventh Technical Meeting, International Union for Conservation of Nature and Natural Resources, Theme I, vol. IV, 1960, pp. 44-52, printed. International Union for Conservation, 2144 P St. NW., Washington 6, D. C. Points out how man's activities can change aquatic environments.

"The Influence of Drainage Works, Levees, Dykes, Dredging, etc., on the Aquatic Environment and Stocks," by T. A. Stuart, Seventh Technical Meeting, International Union for Conservation of Nature and Natural Resources, Theme I, vol. IV, 1960, pp. 337-345, printed. International Union for Conservation, 2144 P St. NW., Washington 6, D. C.

"The Influence of Soil and Water Conservation on Natural Aquatic Resources," by E. B. Worthington, Seventh Technical Meeting, International Union for Conservation of Nature and Natural Resources, Theme I, vol. IV, 1960, pp. 363-364, printed. International Union for Conservation, 2144 P St. NW., Washington 6, D. C.

"An Introduction to the Theme and a Summary of the Background and Experience Papers," by Umberto d'Ancona, Seventh Technical Meeting, International Union for Conservation of Nature and Natural Resources, Theme I, vol. IV, 1960, pp. 7-31, printed. International Union for Conservation, 2144 P St. NW., Washington 6, D. C. This review paper deals with the conservation of aquatic resources from the point of view of conservation of the habitat and the natural biological equilibrium.

"Methods of Minimizing the Deleterious Effects of Water- and Land-Use Practices on Aquatic Resources," by William A. Dill, and G. L. Kesteven, Seventh Technical Meeting, International Union for Conservation of Nature and Natural Resources, Theme I, vol. IV, 1960, pp. 271-307, printed. International Union for Conservation, 2144 P St. NW., Washington 6, D. C.

"Multiple Purpose Planning for Aquatic Resources," by Lloyd O. Meehean, Seventh Technical Meeting, International Union for Conservation of Nature and Natural Resources, Theme I, vol. IV, 1960, pp. 53-60, printed. International Union for Conservation, 2144 P St. NW., Washington 6, D. C. States that the valuable aquatic resources can be preserved provided they are given adequate consideration in the basic planning for conservation of other resources such as soil and water. Generally, aquatic resources are a nonconsumptive use of water as opposed to consumptive use by irrigation, for example.

BALTIC SEA:

Nauchnaia Konferetsiia po Izucheniiu Vnutrennikn Vodoemov Pribaltiki (Transactions of the Fifth Conference on the Study of Inland Waters on the Baltic Sea Region), 280 pp., printed in Russian. Trudy po Red. G. G. Vinberga, Minst, Izd-vo Gelgosuviv. im V. I. Lenina, U.S.S.R., 1959.

BARENTS SEA:

"Causes of Seasonal and Annual Variations in the Density of Cod and Haddock Shoal Concentrations in the Barents Sea," by M. M. Kamshilov, N. V. Mironova, and O. F. Kondratsova, article, Trudy Soveshchanii Ikhtiologicheskaia Komissiia, no. 10, 1960, pp. 117-121, 122-124, printed in Russian. Trudy Soveshchanii Akademiia Nauk SSSR, Ikhtiologicheskaia Komissiia, Moscow, U.S.S.R.

BATHYSPHERE:

"Bathysphere for Operation to a Depth of 600 Meters," by M. N. Diomidov, article, Sudostroyeniye, vol. 26, no. 9, September 1960, pp. 11-13, printed in Russian. Sudostroyeniye, Sovet Ministrov SSR, Sudpromgiz, Suvarooski, Leningrad S-15, U.S.S.R.

BILLFISHES:

"Maryland Billfishes," by Frank Schwartz, article, Maryland Conservationist, vol. 38, no. 4, July-August 1961, pp. 20-24, illus., printed, single copy 25 cents. Department of Game and Inland Fish, State Office Bldg., Box 231, Annapolis, Md. Discusses the blue marlin, white marlin, swordfish, long-billed spearfish, and Atlantic sailfish found in Maryland Waters.

BLACK SEA:

English Translation of Agreement Between the Governments of the Union of Soviet Socialist Republics, the People's Republic of Bulgaria, and the Rumanian People's Republic, Concerning the Fisheries of the Black Sea, FAO Fisheries Biology Technical Paper No. 6, 9 pp., processed, limited distribution. Fish-

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eries Division, Biology Branch, Food and Agriculture Organization of the United Nations, Rome, Italy, February 1961.

BONITO:

"Materials on the Development of Bonito in the Barents Sea," by Iu. F. Pozdniakov, article, Trudy Moskovskogo Mekhaniko Baumaua Imeni, no. 2, 1960, pp. 211-225, printed in Russian. Trudy Moskovskogo Mekhaniko-Mashino-Stroitel'nogo, Instituta Imeni Baumaua, Moscow, U.S.S.R.

CANADA:

Fisheries Statistics of Canada, 1959 (New Brunswick), 32 pp., illus., printed in French and English, 75 Canadian cents. Queen's Printer and Controller of Stationery, Ottawa, Canada, September 1961. Consists of tables giving the quantity and value of the principal species of fish and shellfish landed in New Brunswick, 1944-59; quantity and value of manufactured fishery products, 1944-59; quantity and value of landings by species and fisheries districts, 1958-59; capital equipment in the primary fisheries operations, 1958-59; classification of powered fishing craft by over-all length, 1958-59; number of persons engaged in primary operations by fisheries districts, 1958-59; and persons engaged in the major fisheries, 1958-59.

"Resources for Tomorrow" (A Natural Resources Conference, Montreal--October 23-28, 1961), articles, Trade News, vol. 14, no. 2, August 1961, pp. 3-13, illus., printed. Information and Educational Service, Department of Fisheries, Ottawa, Canada. Contains a summary of each of the papers on fisheries and related topics which were especially prepared for the Natural Resources Conference: "The Role of the Fisheries in the Canadian Economy," by J. A. Crutchfield; "Productive Capacity of Canadian Fisheries," by W. E. Ricker; "The Demand Outlook for the Canadian Fisheries," by W. C. MacKenzie; "Survey of Legislation and Treaties Affecting Fisheries," by S. V. Ozere; "Information and Extension Work in the Atlantic Fisheries," by A. F. Laidlaw; "The Management of Atlantic Salmon," by C. J. Kerswill; "Requirements in Fisheries Research," by W. A. Clemens; "The Organization of Wildlife and Fisheries Research in Canada," by J. R. Dymond; "The Effect of Man-Made Changes on the Environment of Fishes," by P. A. Larkin; and "Multi-Purpose Development of the Fraser River," by A. F. Paget and C. H. Clay.

"Some Freshwater Fishes From Northeastern Quebec and Labrador," by D. E. McAllister, and Sherman Bleakney, article, National Museum of Canada Bulletin, vol. 166, 1959, pp. 31-39, printed. National Museum of Canada, Ottawa, Canada.

CARP:

"Genetic Improvement of Carp. II-Marking Fish by Branding," by Moav Rom, G. Wohlfarth, and M. Lahman, article, Bamidgeh (Bulletin of Fish Culture in Israel), vol. 12, no. 2, 1960, pp. 49-53, printed. Department of Fisheries and Fish Breeders' Association, Nir-David, D. N., Hakirya, Israel.

"Reactions of Aquarium Carp to Food and Flavors," by Howard A. Loeb, article, New York Fish and Game Journal, vol. 7, no. 1, 1960, pp. 60-71, printed. New York Conservation Department, Albany 1, N. Y.

CHESAPEAKE BAY:

Chesapeake Science, vol. 2, nos. 1-2, March-June 1961, 111 pp., illus., printed, single copy, 75 cents. Department of Research and Education, Chesapeake Biological Laboratory, Solomons, Md. Includes, among others, these articles: "The Chesapeake Bay Cooperative Striped Bass Program," by James E. Sykes; "Comparison of Three Tags on Striped Bass in the Chesapeake Bay Area," by Robert M. Lewis; "Age, Growth, and Movements of the Striped Bass, Roccus saxatilis, taken in Size Selective Fishing Gear in Maryland," by Romeo J. Mansueti; "Movements of Striped Bass Tagged in Virginia Waters of Chesapeake Bay," by William H. Massmann and Anthony L. Pacheco; "Reduced Oxygen Tolerance and Toxicity of Petroleum Products to Juvenile American Shad," by Marlin E. Tagatz; and "A Potomac River Shad Fishery, 1814-1824," by William H. Massmann.

COD:

"La Campagne du Navire Oceanographique G.O. Sars--a Permis de Recueillir un Grand Nombre de Renseignements sur les Bancs de Morues du Groenland" (Cruise of the Oceanographic Vessel G. O. Sars--Collected a Large Amount of Data on Greenland's Cod Banks), article, La Peche Maritime, vol. 40, no. 1001, August 1961, pp. 577-578, illus., printed in French, 10 NF (about US$2). La Peche Maritime, 190 Boulevard Haussmann, Paris, France.

"Long Lasting Group Migrations of the Codfish of the Barents Sea According to Tagging Data," by K. G. Konstantinov and V. P. Ponomarenko, article, Trudy Moskovskogo Mekhaniko Baumaua Imeni, no. 2, 1960, pp. 207-210, printed in Russian. Trudy Moskovskogo Mekhaniko-Mashino-Stroitel'nogo, Instituta Imeni Baumaua, Moscow, U.S.S.R.

"State of the Stocks and Abundance of Codfish in the Southern Part of the Barents Sea," by N. A. Maslov, article, Trudy Soveshchanii Ikhtiologicheskaia Komissiia, no. 10, 1960, pp. 106-116, printed in Russian. Trudy Soveshchanii Akademiia Nauk SSSR, Ikhtiologicheskaia Komissiia, Moscow, U.S.S.R.

CONSERVATION:

"Wildlife and Water Conservation," by Clarence Cottam, article, Journal of Soil and Water Conservation, vol. 13, 1958, pp. 65-69, printed. Soil Conservation Society of America, Box 1392, Fairmont, W. Va.

CRUSTACEA:

A Biology of Crustacea, by James Green, 195 pp., illus., printed, $5.75. Quadrangle Books, 119 W. Lake St., Chicago, Ill.

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Some Biological Problems Associated with the Transplantation of Pacific Salmon, by A. I. Smirnov, Translation Series no. 330, 4 pp., processed. (Translated from Russian, Rybnoe Khoziaistvo, no. 10, 1956, pp. 54-56.) Fisheries Research Board of Canada, Biological Station, Nanaimo, B. C., Canada, March 1961.

"Narcotization of Chinook Salmon Fingerlings With Tricaine Methanesulfonate (M.S. 222)," by Ronald Eisler and Tadeusz Backiel, article Transactions of the American Fisheries Society, vol. 89, no. 2, 1960, pp. 164-167, printed. The American Fish-

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eries Society, Secretary, P. O. Box 429, McLean, Va.

Parasitism of Salmon of the Genus (Oncorhynchus) by the Pacific Lamprey, by I. B. Birman, Translation Series no. 290, 4 pp., processed. (Translated from Russian, Izvestiia Tinro, vol. 32, 1950, pp. 158-160.) Fisheries Research Board of Canada, Biological Station, Nanaimo, B. C., Canada, 1960.

On the Period of Formation of the Annual Rings on the Scales of Pacific Salmon and the Rate of Growth of Pinks, by I. B. Birman, Translation Series no. 327, 4 pp., processed. (Translated from Russian, Doklady Akademii Nauk SSSR, vol. 132, no. 5, 1960, pp. 1187-1190.) Fisheries Research Board of Canada, Biological Station, Nanaimo, B. C., Canada, 1960.

Pink Salmon in the Basins of the Barents and White Seas, by E. G. Kossov, M. S. Lazarev, and L. V. Polikashin, Translation Series no. 323, 10 pp., processed. (Translated from Russian, Rybnoe Khoziaistvo, vol. 36, no. 8, 1960, pp. 20-25.) Fisheries Research Board of Canada, Biological Station, Nanaimo, B. C., Canada, 1960.

"Recovery, Growth, and Movement of Hatchery-Reared Lake Atlantic Salmon at Long Pond, Maine," by Keith A. Havey, article, Transactions of the American Fisheries Society, vol. 89, no. 2, 1960, pp. 212-217, printed. The American Fisheries Society, Secretary, P. O. Box 429, McLean, Va.

"Swimming Performance of Juvenile Sockeye Salmon in Salt and Fresh Water," by Alan B. Groves, article, Transactions of the American Fisheries Society, vol. 89, no. 2, 1960, pp. 218-221, printed. The American Fisheries Society, Secretary, P. O. Box 429, McLean, Va.

"A Virus-Like Disease of Chinook Salmon," by A. J. Ross, J. Pelnar, and R. R. Rucker, article, Transactions of the American Fisheries Society, vol. 89, no. 2, 1960, pp. 160-163, printed. The American Fisheries Society, Secretary, P. O. 429, McLean, Va.

SARDINES:

"Franca--A Situacao das Conservas de Sardinhas no Comeco da Campanha de 1961" (France--The Position of Sardine Canning at the Beginning of the 1961 Season), by A. de Torquat, article, Conservas de Peixe, vol. 16, no. 184, July 1961, p. 13, printed in Portuguese. Conservas de Peixe, Sociedade Astoria, Lda., Regueirao dos Anjos, 68, Lisbon, Portugal.

"A Statistical Study of the Estimation of Abundance of Sardine (Sardinops caerulea) Eggs," by Bruce A. Taft, article, Limnology and Oceanography, vol. 5, no. 3, 1960, pp. 245-264, printed. Woods Hole Oceanographic Institution, Woods Hole, Mass.

SEA TROUT:

"Recapture in the River Tweed of a Sea-Trout Marked in Devonshire," by A. Swain, I. R. H. Allan, and M. J. Bulleid, article, Nature, vol. 187, no. 4740, September 3, 1960, p. 877, printed. Nature, St. Martin's Press, Inc., 175 Fifth Ave., New York 10, N. Y.

SHRIMP:

"Habitat of Juvenile Shrimp (Family Penaeidae)," by Gordon Gunter, article, Ecology, vol. 42, no. 3, 1961, pp. 598-600, printed. Ecological Society of America, Duke University Press, Box 6697, College Station, Durham, N. C.

The Influence of Temperature and Light on the Distribution of Shrimps in Medium and Great Depths, by Walter Ghidalia and Francois Bourgois, GFCM Studies and Reviews No. 16, 58 pp., illus., processed. General Fisheries Council for the Mediterranean Secretariat, Food and Agriculture Organization of the United Nations, Rome, Italy, August 1961. Discusses the influence of thermal and haloid characteristics of different types of water on the distribution of crustaceans and the influence of light on the distribution of Peneidae in the Mediterranean. Undertaken for the purpose of analyzing the bottoms where Peneidae live, this study concludes with the statement that "the nature of the sediment and the depth do not alone determine the distribution of the species studies, for temperature and light are equally important."

SMALL CRAFT CHARTS:

Series 165--San Francisco Bay to Antioch, California, 3 pp., illus., printed, $1.50. U. S. Coast and Geodetic Survey, Washington 25, D. C., 1961. Designed to promote safety in small craft navigation, this chart folio contains 3 fold-out charts particularly suited for plotting in close quarters. Tide tables, rules of the road, whistle signals, symbols and abbreviations, storm warning signals, and instructions for obtaining daily weather forecasts are included. The number of facilities available to small craft for docking, supplies, fuel, and services are tabulated and keyed to the chart. This is the fourth in a series of small-craft charts.

SMELT:

"Some Aspects of the Life History of the Smelt Osmerus mordax in Western Lake Superior," by John Hale, article, Minnesota Fish and Game Investigations, no. 2, 1960, pp. 25-41, printed. Minnesota Department of Conservation, 301 Centennial Bldg., 658 Cedar St., St. Paul 1, Minn.

SOUTH AFRICA REPUBLIC:

Fishing Industry Research Institute, Fourteenth Annual Report of the Director, 1 January-31 December, 1960, 48 pp., illus., printed. Fishing Industry Research Institute, University of Cape Town, Rondebosch, South Africa Republic. Includes functions and activities of the Institute and brief accounts of progress in its program of research during 1960. Presents results of investigations covering fresh, frozen, salted and dried, and canned fish; fish sausage and spread; fish meal; stickwater recovery; and routine inspections and analyses.

SPAIN:

"El Ano Pesquero Espanol a Traves de la Estadistica" (The Spanish Fishery Year through Statistics), article, Industrias Pesqueras, vol. 35, no. 817-818, May 15, 1961, pp. 200-203, illus., printed in Spanish. Industrias Pesqueras, 21/2 Policarpo Sanz, Vigo, Spain.

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SPONGES:

Preliminary Discussion of the Sponges of Brazil, by M. W. de Laubenfels, Contribuicoes Avulsas do Instituto Oceanografico, Oceanografia Biologia No. 1, 4 pp., printed in English with Portuguese summary. Instituto Oceanografico, Universidade de Sao Paulo, Sao Paulo, Brazil, 1956.

TAX GUIDE:

Tax Guide for Small Business, 1962 Edition, 144 pp., printed, 40 cents. Internal Revenue Service, Washington, D. C., December 1961. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) The new tax guide (for use in filing the 1961 income tax returns, excise tax returns, and other returns for 1962) consists of explanations and answers to most of the tax problems of the small businessman. In addition it contains a tax calendar for 1962 which should prove helpful to all businessmen throughout the year, since it indicates what he should do and when he should do it in regard to the various Federal taxes. The booklet also has a checklist of special interest to the man just starting in business in that it affords a quick method for determining what Federal taxes for which he may be liable.

TIDE TABLES:

Tidal Current Tables 1962--Atlantic Coast of North America, 182 pp., printed, $1. U. S. Department of Commerce, Coast and Geodetic Survey, Washington 25, D. C., 1961.

Tidal Current Tables 1962--Pacific Coast of North America and Asia, 238 pp., printed, $1. U. S. Department of Commerce, Coast and Geodetic Survey, Washington 25, D. C., 1961.

TILAPIA:

"Comparative Evaluation of Two Tilapias as Pondfishes in Alabama," by H. S. Swingle, article, Transactions of the American Fisheries Society, vol. 89, no. 2, 1960, pp. 142-148, printed. Secretary, The American Fisheries Society, P. O. Box 429, McLean, Va.

TRADE LISTS:

The Bureau of International Business Operations, U. S. Department of Commerce, Washington 25, D. C., has published the following mimeographed trade lists. Copies may be obtained by firms in the United States from that office or from Department of Commerce field offices at $1 a copy.

Canneries and Frozen Foods--Producers and Exporters--Finland, 3 pp. (August 1961). Lists the names and addresses, size of firms, and types of products handled by each firm. Includes fish canneries, freezers, and exporters.

Canneries and Frozen Foods--Producers and Exporters--Uruguay, 6 pp. (August 1961). Lists the names and addresses, size of firms, and types of products handled by each firm. Includes fish and shellfish canneries, freezers, and exporters.

TROUT:

"Comportement Alimentaire de Truites Mouchetees (Salvelinus fontinalis) Elevees en Pisciculture et Ensemencees en Riviere a l'Age Adulte" (Feeding Behavior of Speckled Trout Raised in a Hatchery and Released as Adults in a River), by Adrien Robert, article, Naturaliste Canadien, vol. 87, no. 4, 1960, pp. 113-116, printed. Naturaliste Canadien, L'Universite Laval, Quebec, Canada.

"Effect of Sorting Brown Trout on Sex Ratio and Growth," by D. C. Haskell, R. Davies, and J. Reckahn, article, New York Fish and Game Journal, vol. 7, no. 1, 1960, pp. 39-45, printed. New York Conservation Department, Albany 1, N. Y.

TUNA:

"Australian Tuna Research," article, Fisheries Newsletter, vol. 20, no. 9, September 1961, pp. 20-21, illus., printed. Commonwealth Fisheries Office, Department of Primary Industry, Canberra, Australia. Discusses the work of the Commonwealth Scientific and Industrial Research Organization's Division of Fisheries and Oceanography on tagging tuna. Three research vessels have carried on the work of trolling, collecting data on environmental conditions, and measuring bluefin and yellowfin tuna. Included are tables showing data on long-line landings and on releases and recaptures of fish, 1960/61.

"On the Predatory Relationships Among Bluefin Tuna and Coastal Fishes in the Southern Waters of Japan," by Takeyuki Doi, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 26, no. 2, 1960, pp. 99-102, printed. Japanese Society of Scientific Fisheries 6-chome, Shiba-kaigandori, Minato-ku, Tokyo, Japan.

The Sicilian Tuna Trap, by Vito Fodera, GFCM Studies and Reviews No. 15, 114 pp., illus., processed. General Fisheries Council for the Mediterranean, Secretariat, Food and Agriculture Organization of the United Nations, Rome, Italy, July 1961. A technical paper presented at the Sixth Session of the General Fisheries Council for the Mediterranean, held at Rome, September 22-28, 1960. Outlines the procedure for constructing a madrague (tuna trap) and the materials used. Also discusses setting and operation of the trap. Includes a glossary of terms used in tuna trap fishing in Sicily and a large section containing maps, photos, and detailed drawings of gear.

TURTLES:

"Pacific Turtle Problem," by Archie Carr, article, Natural History, vol. 70, no. 8, October 1961, pp. 64-71, illus., printed, single copy 50 cents. The American Museum of Natural History, Central Park W. at 79th St., New York 24, N.Y. The author describes his observations of the common sea turtles found off the west coast of Mexico. Identification of the turtles, their habitats, and breeding habits are described. Photos and drawings of the turtles add interest to the article.

UNITED KINGDOM:

The Fishing Industry, Cmnd. 1453, 11 pp., printed, 1s. (about 14 U. S. cents). Her Majesty's Stationery Office, York House, Kingsway, London WC2, England, August 1961. A report presented to Parliament by the Secretary of State for the Home Department, the Secretary of State for Scotland, and the Minister of Agriculture, Fisheries and Food by

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command of Her Majesty. Discusses financial assistance to the fishing industry: distant-, middle-, and near-water fleets; inshore and herring fleets; shellfish; grants and loans for vessel construction; and loans for processing plants. Also covers landings, processing, and distribution problems; research and experimental work; and organization of the White Fish Authority and Herring Industry Board. The British Government believes that, although the proposals outlined in this paper differ from the recommendations contained in the Fleck Report, they ". . . represent a constructive approach to the problems of the fishing industry, and provide the different sections of the industry with a reasonable opportunity to adjust themselves to the new conditions which they are now facing."

"Salmon and Freshwater Fishing in Great Britain," by J. W. Jones, article, Nature, vol. 191, no. 4792, September 2, 1961, pp. 962-963, printed. Nature, St. Martin's Press, 175 Fifth Ave., New York 10, N. Y.

U.S.S.R.:

Kaspliskala Fauna v Azovo-Chernomorskom Basseine (Caspian Fauna in the Azov-Black Sea Basin), by F. D. Mordukhai-Boltovskoi, 286 pp., printed in Russian. Izdatelstvo Akademii Nauk SSSR, Moscow, U.S.S.R.

"La Recherche pour les Peches en U.R.S.S. Est Axee sur l'Efficacite" (Fisheries Research in the U.S.S.R. is Based on Efficacy), article, Le Marin, vol. 15, no. 742, August 25, 1961, pp. 1, 10, printed in French. Le Marin, 38 rue du Pre-Botte, Rennes (I. & V.), France.

WATER UTILIZATION:

"Fishery Problems Created by Water Utilization Projects in Scotland and East Africa," by Vernon D. Van Someren, Seventh Technical Meeting, International Union for Conservation of Nature and Natural Resources, Theme I, vol. IV, 1960, pp. 323-336, printed. International Union for Conservation, 2144 P St. NW., Washington 6, D. C.

"Some Influences of Multi-Purpose Water Usage on Water Quality," by Robert O. Sylvester, Seventh Technical Meeting, International Union for Conservation of Nature and Natural Resources, Theme I, vol. IV, 1960, pp. 215-235, printed. International Union for Conservation, 2144 P St. NW., Washington 6, D. C.

WEST AFRICA:

"Primo Elenco di Pesci Raccolti in Atlantico nelle Acque della Mauritania, del Sahara Spagnolo e delle Canarie" (First Group of Fish Collected in Atlantic Waters of Mauritania, of Spanish Sahara, and of the Canary Islands), by Andrea Scaccini, article, Thalassia, vol. 4, no. 10, 1941, pp. 3-49, illus., printed in Italian. Instituto Italo-Germanico di Biologia Marian di Rovigno d'Istria, Venice, Italy.

WHALING:

"IWC Report: Antarctic Whaling," article, Fisheries Newsletter, vol. 20, no. 8, August 1961, pp. 23, 27, printed. Commonwealth Fisheries Office, Department of Primary Industry, Canberra, Australia. In the 1960/61 Antarctic pelagic whaling season, 21 fleets from 5 nations took 16,427 blue-whale units, compared with 15,512 taken by 20 fleets in 1959/60. The catch quota for the 1960/61 season was 17,780 blue-whale units. The International Whaling Commission has responsibility for establishing a total quota for Antarctic pelagic whaling. The five countries (Japan, Netherlands, Norway, United Kingdom, and U.S.S.R.) engaged in Antarctic whaling held a series of meetings in London for the purpose of agreeing on a formula for division of the total quota.

"The World Catch 1960," article, Norsk Hvalfangst-Tidende (The Norwegian Whaling Gazette), vol. 50, no. 7, July 1961, pp. 293-300, 303-308, illus., printed. Norsk Havalfangst-Tidende, Hvalfangerforeningen, Sandefjord, Norway. A detailed report on the whale catch in the Antarctic in the season 1959/60 and in grounds outside the Antarctic in the calendar year 1960 by companies of various nations. Discusses the whaling grounds and details of whaling activities in all areas of the world. Whaling fleets from 17 nations participated during 1960, operating in the North and South Pacific, the South Atlantic, and the Antarctic areas. A total of 63,205 whales were landed during the year. Included are statistical tables showing landings by geographical area and by company, by country, and by location of whaling grounds. Also included is a world map showing whaling areas during 1960.

WORLD TRADE:

The following printed World Trade Information Service Reports, published by the Bureau of Foreign Commerce, U. S. Department of Commerce, Washington, D. C., are for sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

Import Tariff System of Portugal, Operations Report No. 61-41, WTIS Part 2, 2 pp., 10 cents, July 1961.

Foreign Government Purchasing Agencies in the United States, Operations Report No. 61-42, WTIS Part 2, 4 pp., printed, 10 cents, July 1961.

Licensing and Exchange Controls--New Zealand, Operations Report No. 61-45, WTIS Part 2, 7 pp., 10 cents, August 1961.

Economic Developments in Japan, 1960, Economic Report No. 61-46, WTIS Part 1, 10 pp., 15 cents, June 1961.

Import Tariff System of Egypt (UAR), Operations Report No. 61-46, WTIS Part 2, 2 pp., 10 cents, August 1961.

Licensing and Exchange Controls--Afghanistan, Operations Report No. 61-48, WTIS Part 2, 3 pp., 10 cents, August 1961.

Food Regulations of Sweden, Operations Report No. 61-50, WTIS Part 2, 8 pp., 10 cents, August 1961.

Licensing and Exchange Controls--Cambodia, Operations Report No. 61-53, WTIS Part 2, 6 pp., 10 cents, August 1961.

Import Tariff System of Spain, Operations Report No. 61-54, WTIS Part 2, 2 pp., 10 cents, August 1961.

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Investment Factors in Thailand, Economic Report No. 61-61, WTIS Part 1, 8 pp., illus., 15 cents, August 1961.

YELLOW PIKE:
"First-Year Growth of the Walleye, Stizostedion vitreum vitreum (Mitchell), and Associated Factors in the Red Lakes, Minnesota," by Lloyd L. Smith Jr. and Richard L. Pycha, article, Limnology and Oceanography, vol. 5, no. 3, 1960, pp. 281-290, printed. Woods Hole Oceanographic Institution, Woods Hole, Mass.

CORRECTION

In the October 1961 issue, page 110, article "Plasma Proteins in the Blood of Fishes from the Gulf of Mexico," the address of the publisher of the American Journal of Physiology was given in error. The correct address is American Physiology Society, 9650 Wisconsin Ave. NW., Washington, D. C.

PACIFIC NORTHWEST RAINBOW TROUT TRANSPLANTED IN VENEZUELA AND HAWAII

In Venezuelan waters sport fishermen are going to be casting for Pacific Northwest rainbow trout, nature willing and cooperative.

So will Hawaiians and their tourist guests who fish in the streams of those Pacific islands.

The Department of Interior's Bureau of Sport Fisheries and Wildlife rainbow trout hatchery in north central Washington (near Winthrop) early in 1961 sent 200,000 of the more than 4,000,000 rainbow trout eggs taken in that hatchery to Caracas, Venezuela and Honolulu, Hawaii. The eggs were carefully placed on trays, packed in ice, and sent by jet planes. The eggs have been planted in the fishing streams for hatching. The 200,000 eggs were evenly divided between Venezuela and Hawaii.

Bureau of Sport Fisheries and Wildlife officials say there is every reason to believe the project of transplanting trout from the Pacific Northwest to the warmer areas of Venezuela and Hawaii will be successful and the eggs moved those thousands of miles will produce fish for the anglers and the base stock for future natural production in the South American country and the new state of the United States.

The eggs to Hawaii, in the air only a few hours, arrived in excellent condition, according to the Division of Fish and Game of the State of Hawaii Department of Agriculture and Conservation.

The eggs were put in slotted plastic boxes and the boxes then placed in streams of the Kokee public fishing area. The slots in the boxes provide for escapement. They are small enough to hold the eggs, but large enough so the young fish can swim through them into the stream and start feeding. (Outdoor California, April 1961.)

Season's
Greetings